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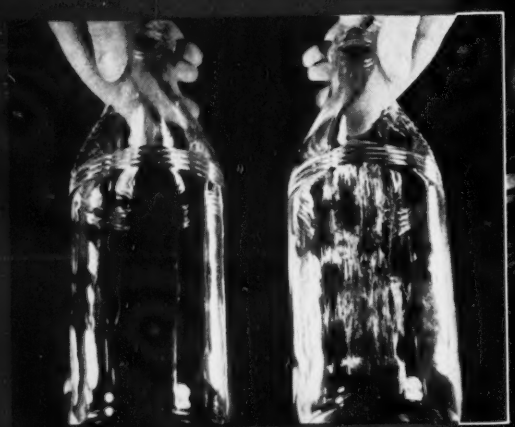
July 1954

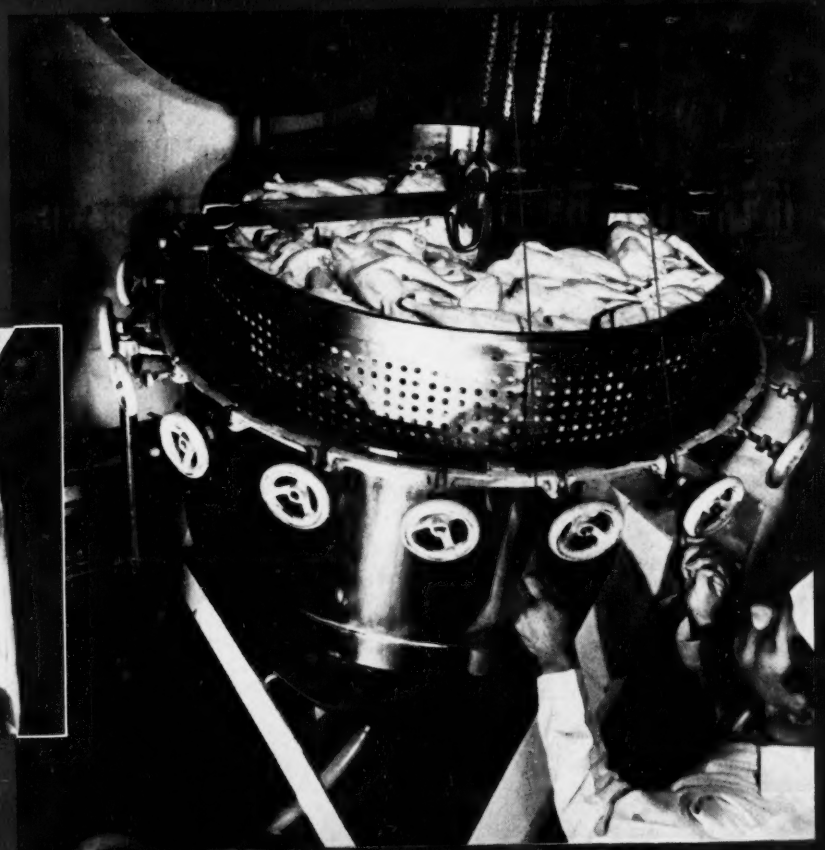
# FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

**SANITATION** Diffraction deposit analysis permits fast chemical cleaning. p. 57



**PACKAGING** Silicone coated bottle doesn't scratch, and it speeds line. p. 121



**PROCESSING** Vacuum cools cooked poultry in 20 min. instead of 12 hr., seeming production and improving quality. p. 60

**MATERIALS HANDLING** One man loads and unloads truck in 15 min. p. 125

ALSO: Ingredients · Maintenance · Quality Control · Transportation · Plant Engineering · Personnel · Instruments . . . Turn for Index details

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*July 1954*
*Volume 26 Number 7*

# FOOD ENGINEERING

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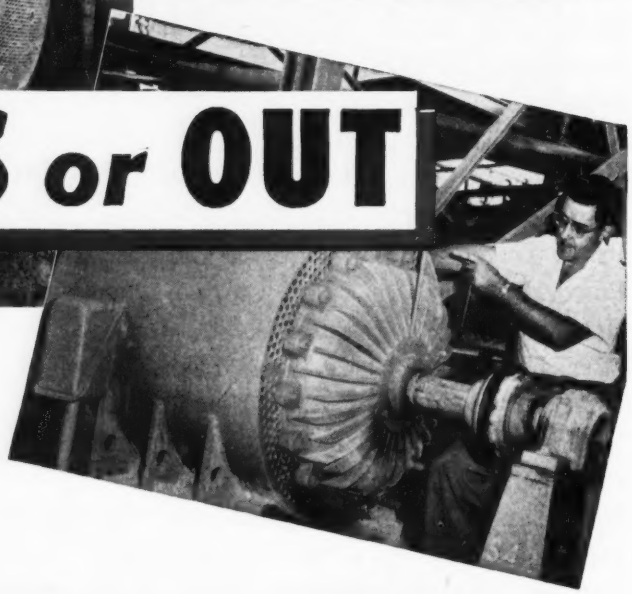
ALLIS-CHALMERS

Totally-Enclosed Fan-Cooled MOTORS

# INDOORS or OUT



## DIRT and CORROSION

# Can't Hurt These Motors

**Here is a totally-enclosed type of motor** that will solve many of your dirt and corrosion problems. Install anywhere, indoors or out.

### Cooling System is Self-cleaning

Cooling air is carried through the heat-exchanger tubes with sufficient velocity to expel practically any kind of dirt. If oily or sticky dirt should cling, tubes can be ramrodded clean in a few minutes because tubes are straight and tube ends are exposed.

### Choice of Corrosion-resistant Materials

You can lick corrosion with this motor, too. Tubes are available in a variety of materials to meet practically any corrosive atmospheric condition. Allis-Chalmers tube-type motors have long and successful experience in such difficult applications as caustic plants, refineries and petrochemical plants, power plants with fly ash problems and many others.

Next time you need a motor for a dirty or corrosive location or for outdoor operation in all kinds of weather, call your Allis-Chalmers District Office. Get complete information on Allis-Chalmers tube-type totally-enclosed, fan-cooled and explosion-proof motors. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7149. Available in ratings on frames larger than NEMA 505 up to 3000 hp. A-4222

*Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

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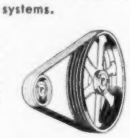
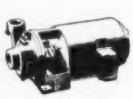
**CONTROL** — Manual, magnetic and combination starters; push button stations and components for complete control systems.

***TEXROPE*** V-belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.



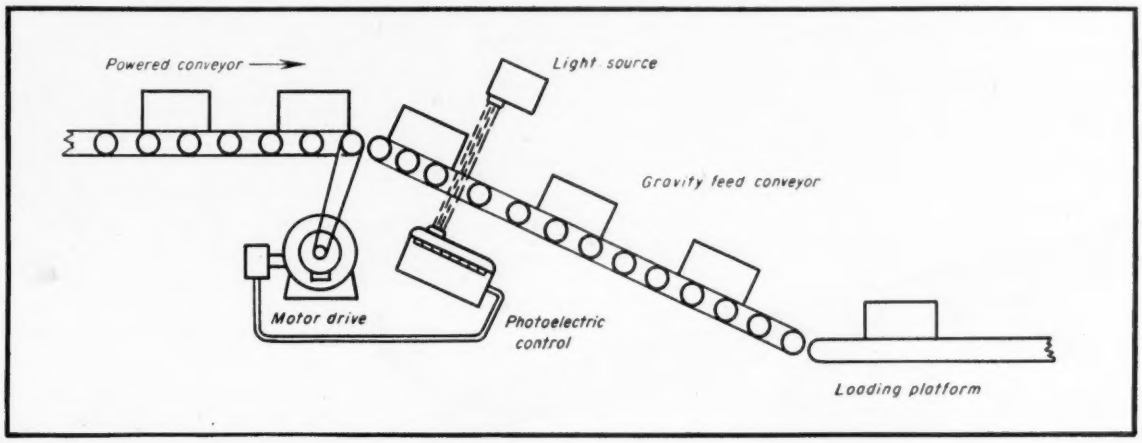


**PUMPS** — Integral types from ¾ in. to 72 in. discharge and up.

# ALLIS-CHALMERS

A-C ALLIS-CHALMERS

# PRACTICAL IDEAS




## Case-Jamming Prevented

Case pile-up on conveyors particularly in brewery, beverage and other branches handling cases of glass containers, can be the cause of costly damage to both merchandise and conveyors, and also the loss of production time.

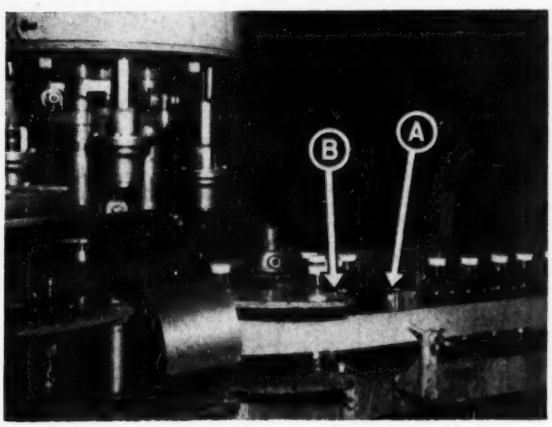
Jamming can be detected and controlled with an arrangement consisting of a delayed action photoelectric control incorporated with electronic timing.

Photoelectric system is so located that its control beam is broken each time a case passes along a conveyor. So long as the timing circuit receives impulses at regular intervals, due to restoration of light beam between cases, load circuit of the photoelectric control will remain closed and so will maintain the conveyor motor in operation.

The timing interval starts each time a carton breaks a light beam, but timing circuit is reset without relay action each time the beam is restored before the preset timing interval has elapsed.

If a jam occurs, causing cases to butt one against the other, light beam can no longer reach the control. Timing circuit will then "time out", to open the load circuit and stop the conveyor motor.

Relay action is reduced to only those occasions when a pile-up occurs. Since the relay armature motion is the only mechanical motion which takes place, this reduction of its operation frequency multiplies the life of the equipment and minimizes maintenance requirements—*Photoswitch, Inc., Cambridge, Mass.*




## Device Stops Bottle Capper Jams

By adding a spring-operated metal gate (1½ x 6 in.) about 1 ft. from our 4-head rotary capper's discharge, we've been able to shunt bottles off into a temporary accumulating area in the event of jam-ups farther along the line. In this way, jam-ups at the capper are avoided.

Here's how it works: When bottles jam-up on their way to the wrap-around-labels, pressure of bottles backed up on the line, forces the gate (A) open. Bottles then go into the accumulating area (B) as the gate engages a microswitch that stops the entire line. This includes capper, filler, bottle washer, unscrambler, and conveyor. When the jam has been cleared up, the gate swings back into a closed position. Operation of the entire line is then resumed.—*Archibald F. Beith, Master Mechanic, Refined Syrups & Sugars, Inc., Yonkers, N. Y.*

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**(Formerly Food Industries)**
**June 1954 Vol. 26, No. 6**
Member ABC and ABP

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# professional service for GATX tank cars

The 47,000 tank cars of the GATX fleet are given regular maintenance at more than 30 General American car repair shops located throughout the U.S.A. No car is ever more than a few hours away from a General American shop.

There, tank car experts can service the 200-plus types of GATX cars with specialized tools, jigs and fixtures, testing equipment and replacement parts. These car repair shops use the facilities and experience developed in building the fleet. They work with the traffic and mechanical departments to supply an integrated tank car service, giving shippers great flexibility of car types and dependable transportation for bulk liquids.

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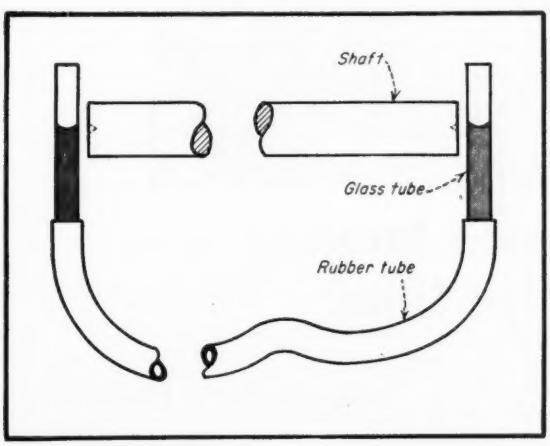
## Ready Check on Maintenance

Decalcomania, prominently placed on Kroger Co. trailers, gives space for maintenance and inspection record. grease pencil recorded. Superintendent and traveling supervisors are thus enabled to keep a continual check on garage operations.

Wherever a Kroger trailer is encountered, a glance at the decal record (see photo) will tell if an inspection is over due.—*"Fleet Owner" Magazine, McGraw-Hill Publishing Co., Inc.*




## Unusual Type Level

Though the method we have devised for determining level has been simple and inexpensive to construct, it has not only proved efficient, but has been the means of accurately leveling under circumstances where a conventional spirit level could not be applied.

The instrument consists of [illegible]gth of ¼ in. surgical rubber tubing about 10 ft. l[illegible]nd two, 1 ft. lengths of ¼ in. glass tubing. Into each end of the rubber tubing is inserted one of the lengths of glass tubing. Then water is drawn or forced into the assembly until the liquid reaches a height midway in the glass tubes when they are held next to each other, parallel and in a vertical position. Unit is then ready for use.

This type of level-determining instrument can be applied where the conventional spirit level is useless. When we wanted to check the level of the fan shaft (see sketch) in our evaporative condenser (where no machined surface was available for applying a spirit level) one end of the glass tubes of the new type instrument was held so that the meniscus of the liquid was in line with the shaft's center at one end. When the other glass tube was held at the opposite end of the shaft, the difference in elevation could be determined accurately.

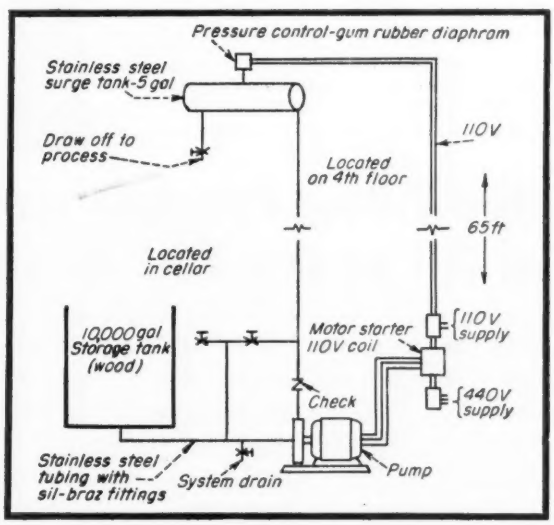
In a similar manner we were able to check the level of our beverage fillers. This was an operation which previously required removal of the filler bowl's head, flooding it with water, and observing the points of overflow.

When the instrument is not in use the glass tubes are connected together with a 2- to 3-in. length of ¼ in. hose to prevent the water in the level from evaporating or spilling out.—*A. J. Morgan, Jr., Norfolk, Coca-Cola Bottling Works, Norfolk, Virginia.*

## Reduces Machine Shutdown Time

To meet consumer demands, bottling lines in the Cincinnati Coca-Cola plant are kept so busy that production loss is involved if the machines are stopped for lubrication.

Therefore, all lubrication fittings on bottling machinery have been equipped with extensions that reach beyond the moving parts of the bottling line. Now, the maintenance crew can lubricate the equipment from a position alongside the machinery, and do it while the machinery is operating. Formerly, it was necessary for the lube men to crawl under bottling conveyors to get at lubrication fixtures. This necessitated stopping the machinery for safety purposes.—*FE Staff*



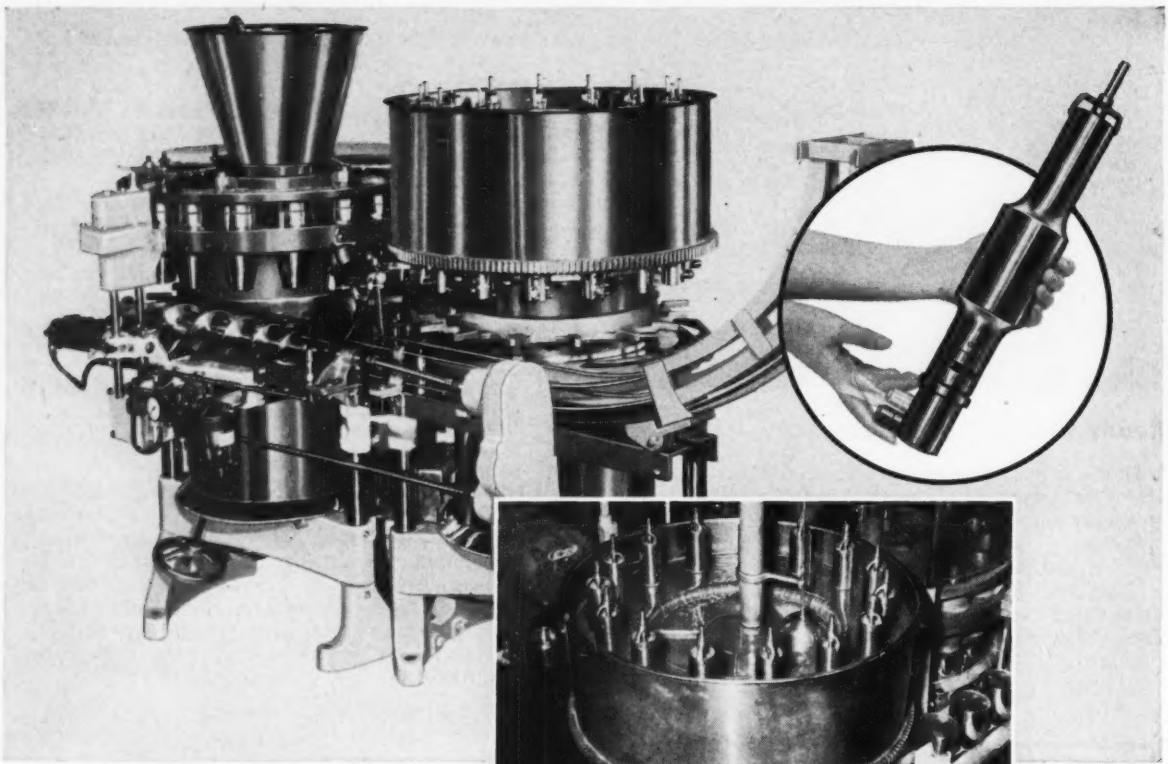

## Controls Vinegar Supply

Problem at the Red Wing Company, Inc., Fredonia, New York, was to maintain a supply of vinegar in a closed 5 gal. stainless steel surge tank on the fourth floor of the plant from a 10,000 gal. wooden tank in the basement.

This is how it was done:

A mercury switch-type pressure controller used with a gum-rubber diaphragm was installed with sensing tap located at the top of the surge tank, with the diaphragm between the controller bellows and the tank. Then, the controller was electrically connected to the motor starter of the pump more than 65 ft. away.

Controller is set to make the circuit and start the pump when the pressure drops to 10 lb. per sq. in. in



Top view of overflow briner, showing the measuring tubes of its 15 filling valves in action. Inset above, valve is shown with movable slide in its two operating positions: up to fill measuring tube, down to empty liquid into can. Simplified valve consists of only three parts!

# New Filling Principle Improves Accuracy of Fill on this FMC 15 Station Filler

Long a favorite for filling and brining such products as peas, beans and whole grain corn, the famous FMC 15 Station Filler takes on a "new look" and new accuracy with the introduction of an overflow briner with simplified, two-position pre-measuring briner valves. This, plus many improvements in the product filler, combine to make it the most accurate two-in-one filler of its type. Spillage and waste of product and brine are virtually eliminated by the FMC "No can —No fill" mechanism, banked can track, smooth feed, tangential transfer and easy take-off of cans. Get full information on the many money-saving features of this truly outstanding FMC Filler.

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- FMC Hand Pack Fillers
- FMC Juice Fillers
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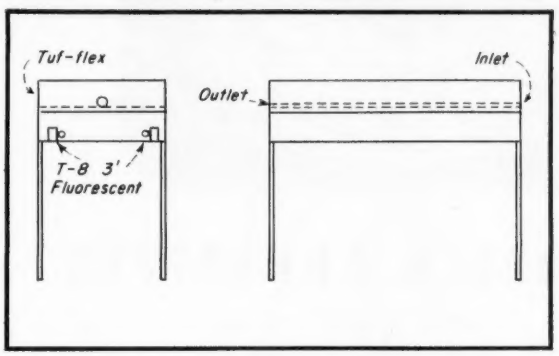
the surge tank and to stop the pump when the pressure builds up to 30 lb. per sq. in. Though this is quite a wide differential, it assures vinegar in the surge tank at all times.

Operator now need give no time or thought to vinegar supply. It can always be drawn off by opening a valve, while the pressure controller starts and stops the pump as required.—*"Industrial Control News," Minneapolis-Honeywell Regulator Co., Philadelphia.*




## Sure Inspection With Luminous Light

Until recently, inspection of preserves to be packed in glass at Tea Garden Products Co., San Leandro, Cal., required flowing material over a steel table lighted with 30-100 footcandles from above.

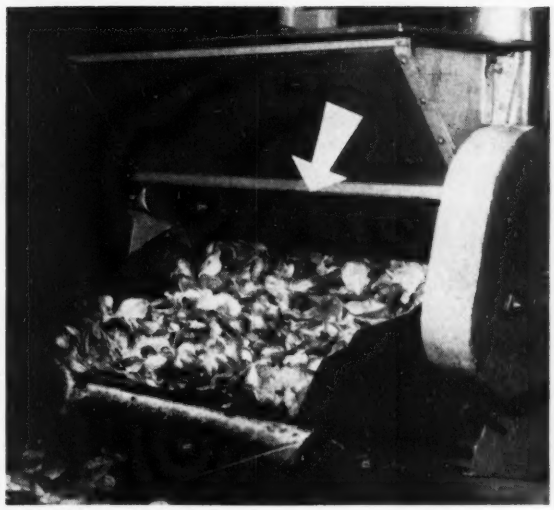
Detecting foreign substances was a difficult task because of the reflected glare from the overhead lighting. And further, even the most skilled inspectors could see no more than surface characteristics. Since preserves and jelly are naturally translucent, the idea developed that more efficient inspection would be possible if products were silhouetted against a luminous background.

Here's how it was accomplished:

By replacing inspection table's metal top with one of shatter-proof glass (2 ft. by 3 ft.) and locating a light source below (see photo) an inspection table with adequate illumination was obtained. Tuf-flex glass was selected because of its resistance to thermal shocks. Two T-8, 36 in. fluorescent lamps (see sketch) mounted approximately 4 in. below inspection plate provided the light. Thus brightness of fruit flow is at least 20 ft.-lamberts. Total cost was less than $100.00.

Transillumination permits inspector to see through and below product. Thereby any foreign substance is silhouetted-black in an area of glowing product.

One inspector is now adequate when formerly several were required.—*Raymond P. Benton, Lighting Engineer, Pacific Gas and Electric Co., San Leandro, Calif.*



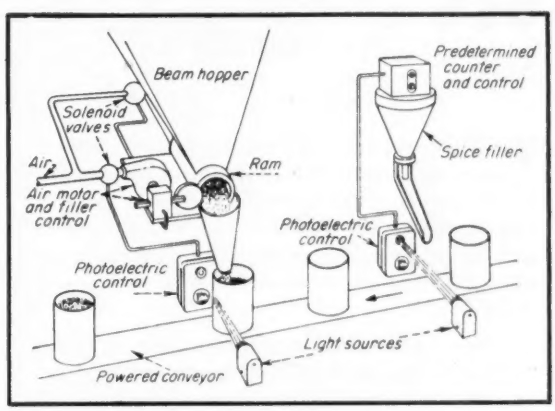
## Shift To Plastic Ends Roll Erosion

Dispensers which formerly proportioned salt to potato chips at Brown Bro. Inc., Altoona, Pa., required unrelenting clean-up to prevent salt corrosion of the rolls and resulting "off" taste of the next day's production.

Now, since metal rolls have been replaced with ones machined from thermosetting laminated plastic cylinders (see photo), corrosion and product flavor change are avoided.

Two years of use have proved that a specially treated fine weave cotton filler impregnated with a phenolic resin is neutral and imparts no flavor to the product.

Also, rolls have not chipped under severe conditions and stay clean and dry.—*FE Staff.*




## Electronic Container Filling

Speed, uniformity and flexibility of automatic filling operations can be improved by substituting electronic timer control (see sketch) for more complicated volumetric and weighing methods.

Extreme accuracy of high quality electronic timers under conditions of short interval repeat-cycle operation makes them suitable for filling control on any installation where the rate of flow or pressure is constant.

Furthermore, changing from a filling operation on one size container to another size involved merely a new setting on the timer dial while conventional filling systems require that the machine be set up to accommodate one particular container.

On most installations, the electronic timer actuates a



solenoid valve whenever a container is shifted into the

It is advisable to take still another precaution to prevent

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solenoid valve whenever a container is shifted into the filling position. Timer will maintain the solenoid valve energized for the exact length of time that is necessary to bring the product to desired height in container.—*Photoswitch, Inc., Cambridge, Mass.*

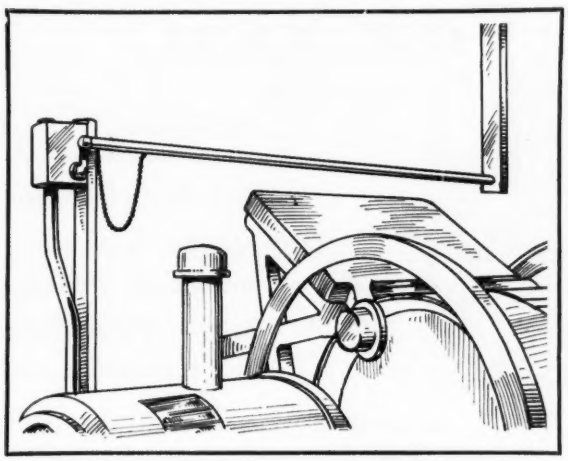
## Sound Truck Serves Citizens

Local civic groups in Cincinnati sometimes have occasion to use a sound truck in connection with various activities and campaigns. So, Rubel Baking Co. builds goodwill, and at the same time gets its name paraded through the streets of Cincinnati "with sound effects" by loaning a specially equipped sound truck to these civic groups.

The truck is a small panel-body vehicle, painted white, with red lettering spelling out the name of the company and its product. Two large sound horns are mounted atop the truck, and the sound equipment is inside.—*FE Staff*

## A Dozen Man-lift Safety Measures

Here are a number of precautions which may be taken to add to the safety of workers whose duties require them to ride man-lifts.



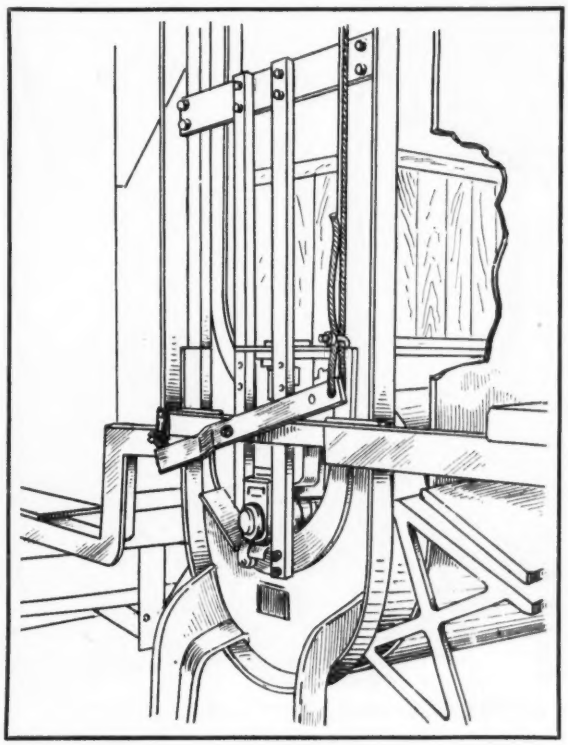
### Three Ways to Prevent Over-ride

If a worker fails to dismount from a man-lift at the top floor landing and is carried over the top of the lift, a serious accident will result.

A safety measure provided with most man-lift installations is a handrail above the top floor dismounting area which, if grasped by the rider will interrupt the circuit to the man-lift motor and immediately stop it. It is much safer to install two safety rails, one on each side, so that grasping either one of them will stop the lift.

It is advisable to take still another precaution to prevent over-ride. This can be done by suspending a light rod of aluminum or bamboo in the path of the rider located so as to be cleared by the lift platform. Disengaging this light rod from its position operates a microswitch which then interrupts the circuit to the lift motor.

Here's another precaution which minimized danger from override. Install a handrail protected platform above upper pulley with head clearance above sufficient to permit standing upon it upright. This not only provides a place for a rider to dismount in the event that he has succeeded in riding past the other over-ride safety devices, but it also provides a convenient work area for repair men.



### Weight Take-Ups Preferable

Temperature and humidity changes effect belt length and can cause either excessive tension or slippage at the head pulley because of inadequate tension when screw take-ups are used. Excessive tension has resulted in head shaft failures on old style drives, and certainly contributes to short belt life by tending to tear the splices open.

It is a simple matter to install weight boxes in place of the screws in the normal screw take-up. Such a weight box is placed above the tail pulley between the two belts to provide automatic uniform tension on the belt.

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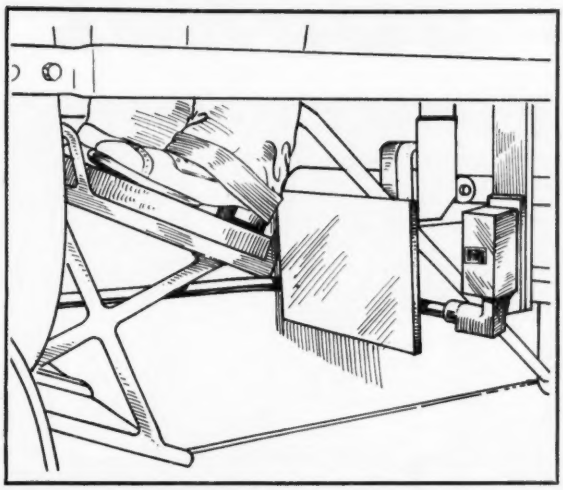
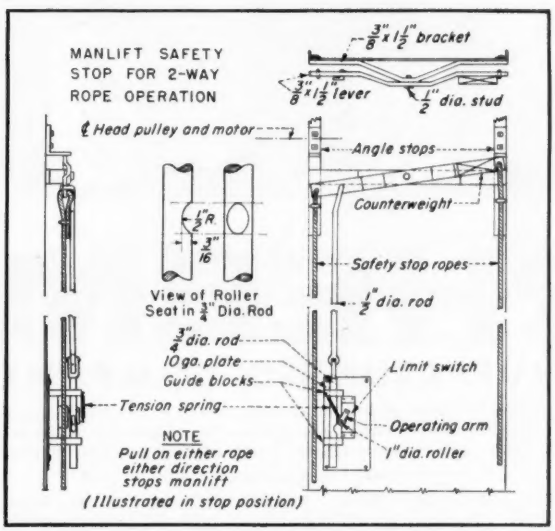
### Place Safety Cradle Under Top Pulley

Though headshaft failures are unlikely in modern installations, it is still advisable to take no chances on the serious consequences which can result in the event of shaft breakage. Install a sturdy metal cradle surfaced with brake lining under and just clear of the head pulley. In the event of failure the cradle serves both to catch and to stop the pulley. In fact, a cradle can be designed as a mechanical safety break operable from the safety rope and independent of any failure of keyways, gears, belts or shafts in the speed-reduction system.



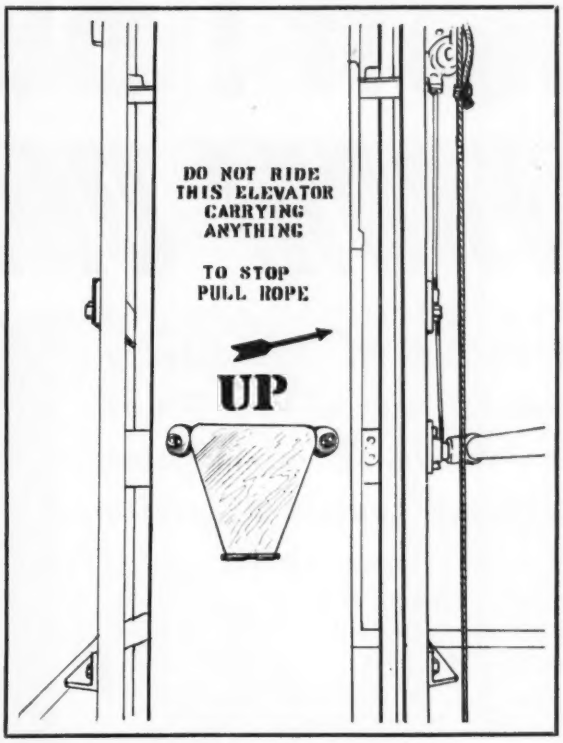
### Bottom Landing Protection

Where the downside bottom landing is retained, a good over-travel safety can be built around a bar or board hinge-mounted parallel and close to the edge of the step and located just below the platform. This takes advantage of the fact that passengers normally ride with their heels projecting far enough to catch and trip the bar to stop lift.




### Any-Direction Safety Rope

Conventional man-lift installations provide a safety rope which operates in the direction of the belt travel only. However, there have been instances in which a belt has reversed its normal direction. It is, therefore, desirable that the safety rope be arranged to stop on a pull in either direction.




### Prevent Grasping Handle on Downside

It is important to provide means to prevent a rider from inadvertently grasping the handle under a step instead of the one above it. One method is to provide a cup handle that can be seized only from the proper direction. This, however, is objectionable because tools or other objects can be put in these cup handles to be discharged over the top of the lift and fall on the heads of those riding the downside.

A better way is to employ the conventional handle and provide a free hinged flap of belting or plywood which hangs below the handle on the ascent, but completely covers it on the descent.

In the event leather is used it should be so stiff that it cannot be tucked into the handle and it should also be punched with enough holes to spoil it for shoe-sole purposes.

### Other Safety Measures

Provide a ladder on the side of the man-lift frame to permit riders to dismount and descend to floor level in the event the belt is stopped.

If precautionary signs are painted on the man-lift belt, the recommendation of the belt manufacturer should be used in selecting the paint. Belt life will be shortened by the use of improper materials.

Lighting should be arranged so that the lift cannot run in the dark. Also lighting should be on an independent circuit without a manual switch and with a relay in the motor control circuit that will stop the man-lift or prevent its being started if the lights should go out.

For the protection of mechanics, janitors or others who have occasion to work around man-lift openings, control circuit switches can be located at each landing which may be locked into the "off" position when desired.—*Howard Stackhouse, General Foods Corp. Technical Bulletin.*

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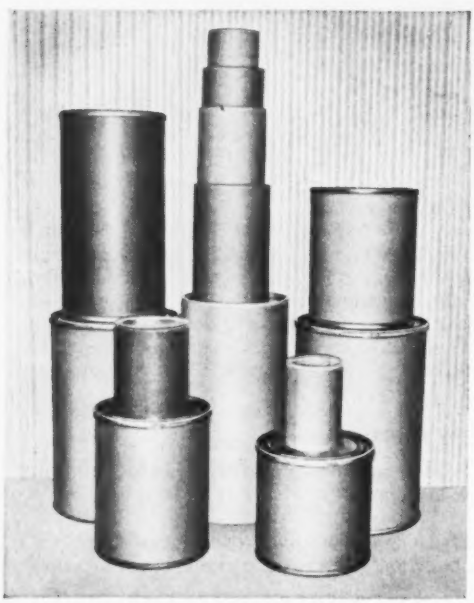

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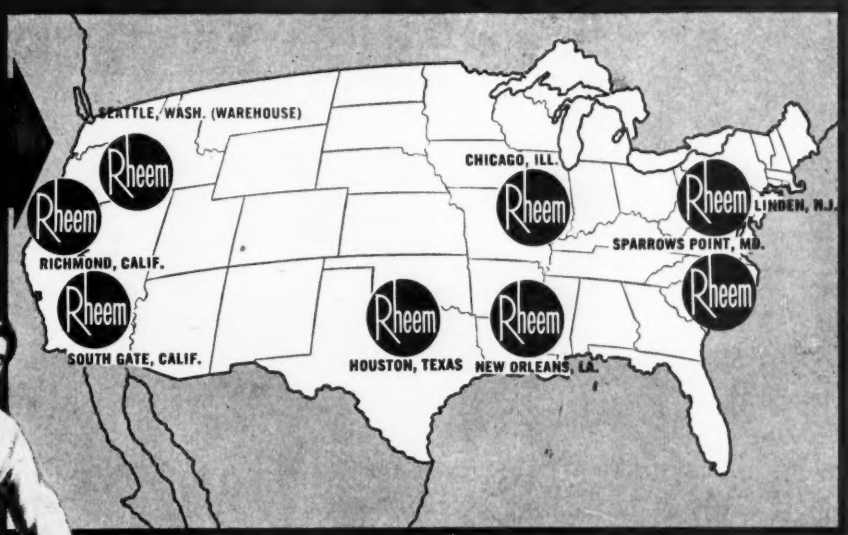

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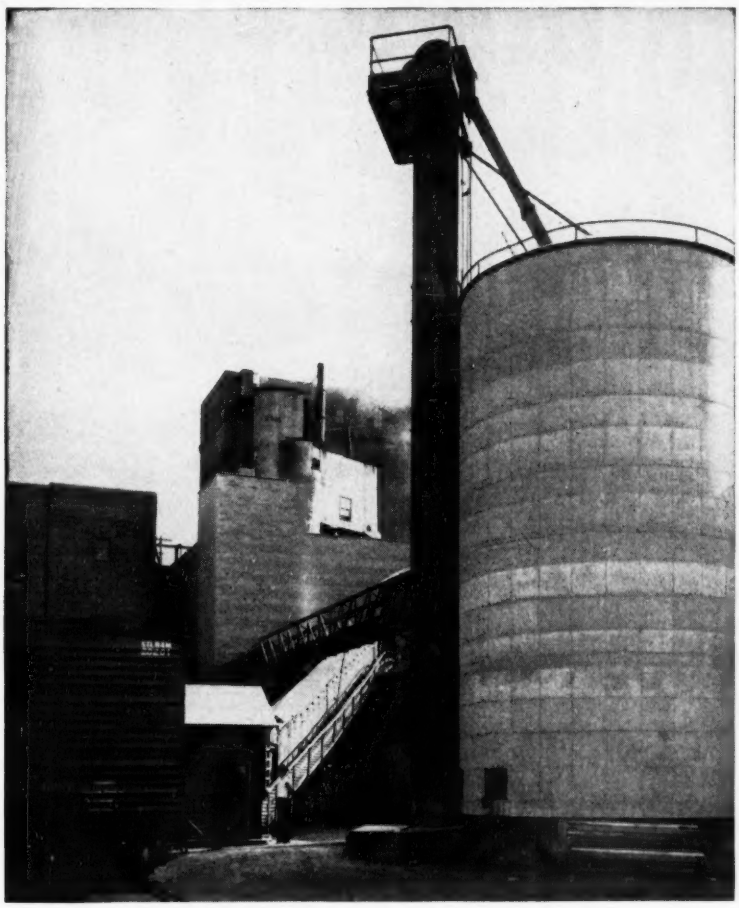
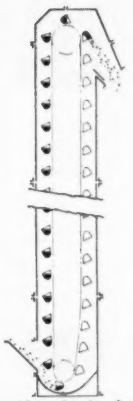
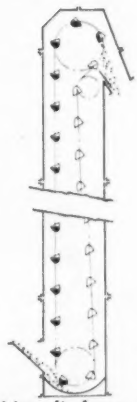


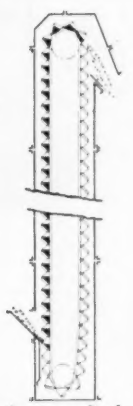
Link-Belt screw conveyor and bucket elevator handle material from railroad car to storage silo.



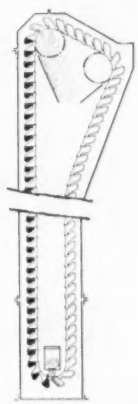
***Centrifugal discharge*** for free-flowing, fine or loose materials with small to medium lumps.



***Positive discharge*** for light, fluffy, fragile or any materials that tend to stick to the buckets.



***Continuous discharge*** for many materials — light to heavy, small to large, abrasive lumps.



***Internal discharge*** for gentle handling of small articles such as pellets, rivets, seeds, castings.

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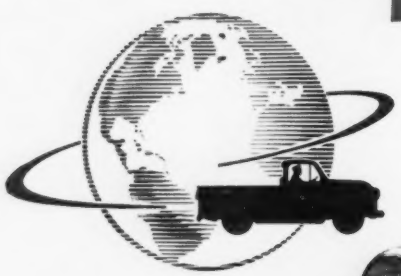

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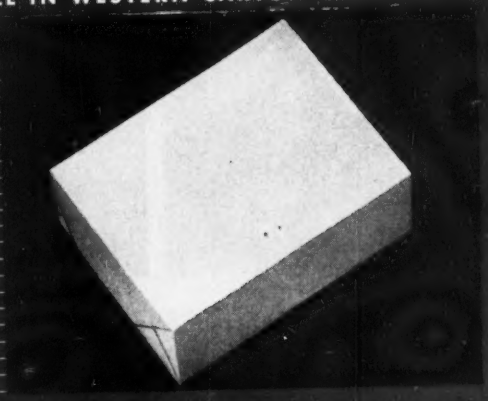

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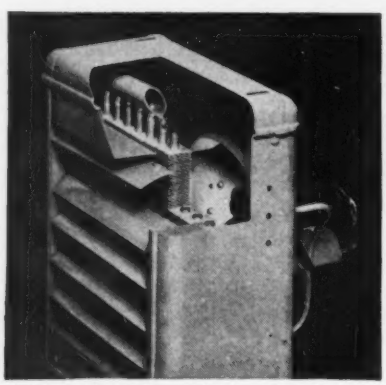

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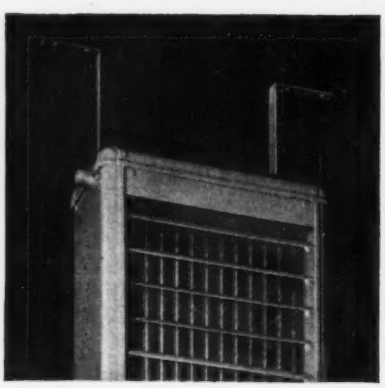

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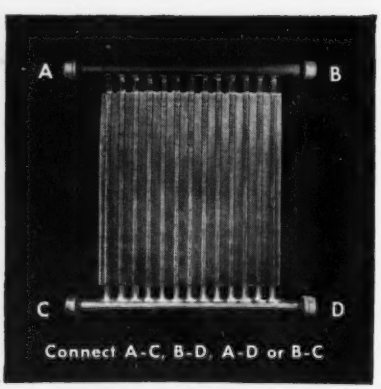


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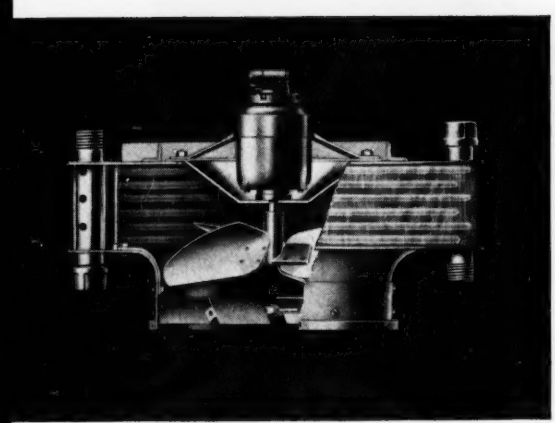

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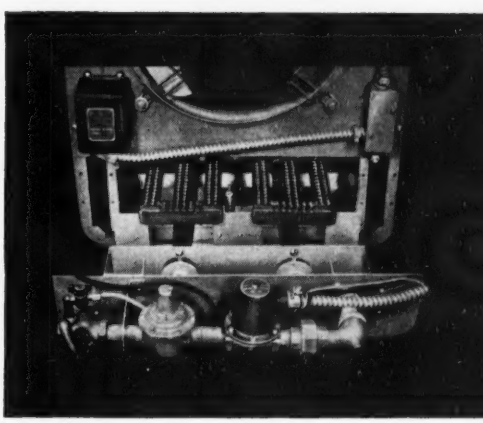

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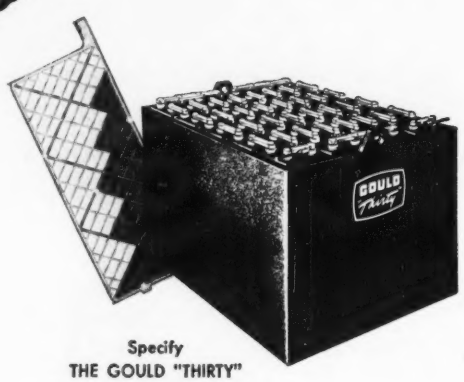


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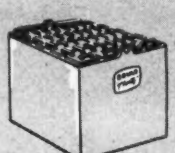

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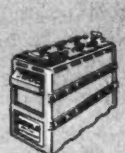

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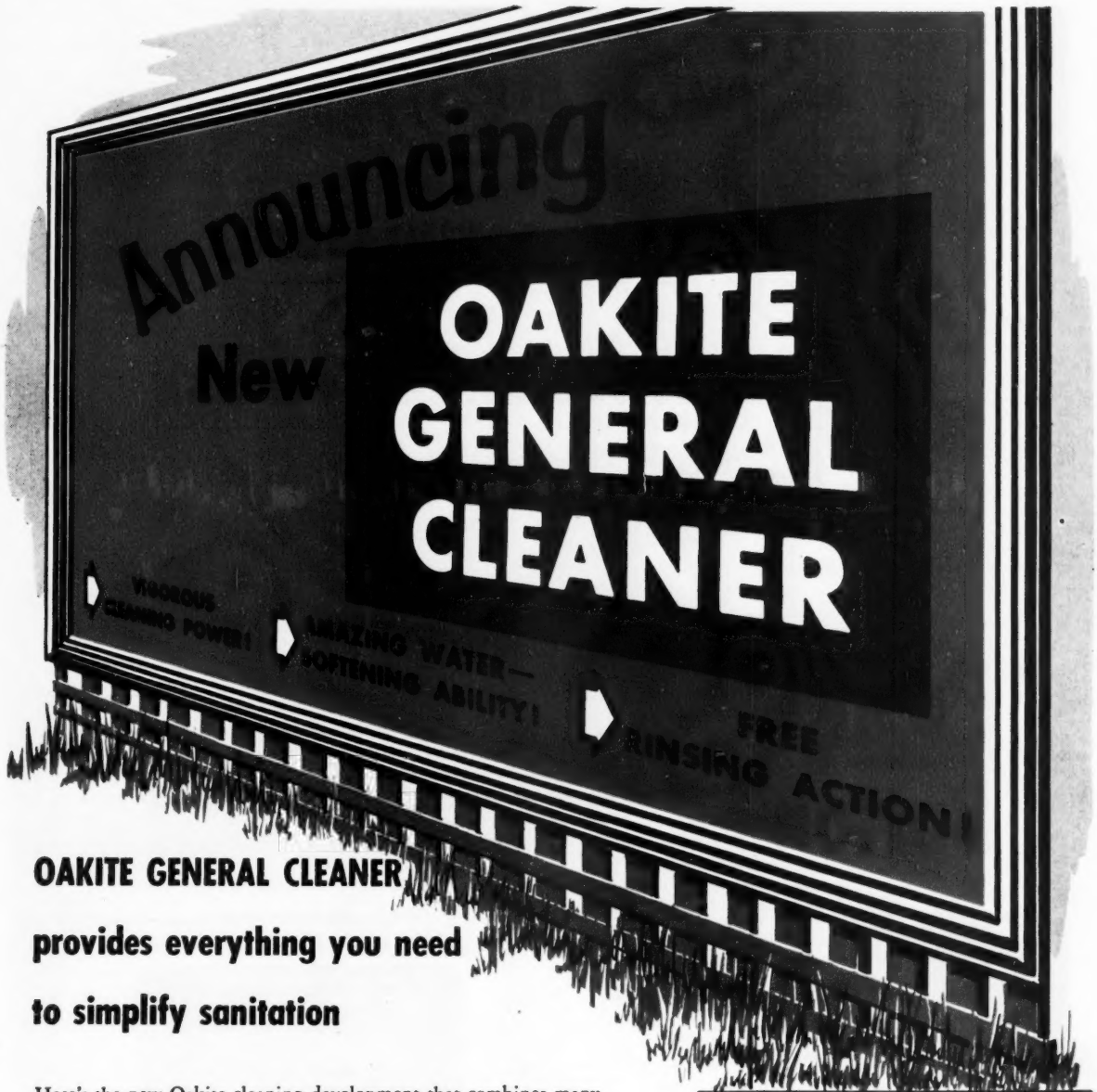


## OAKITE GENERAL CLEANER provides everything you need to simplify sanitation

Here's the new Oakite cleaning development that combines many big advantages into one dirt-banishing detergent—advantages that make it one of the most effective, economical, work-saving, all-purpose cleaners available.

Read the quick facts on OAKITE GENERAL CLEANER. See if you don't agree that such a material gives you everything you need to simplify as well as cut the cost of general sanitation throughout your plant—be it dairy, food, canning, meat packing, bakery or bottling. A trial will convince you that OAKITE GENERAL CLEANER is just what you've been looking for to sanitize your handling and processing equipment either manually or by mechanical methods.

Complete details, demonstration on request. Write Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

**OAKITE**

REG. U. S. PAT. OFF.

Technical Service Representatives in Principal Cities of U.S. & Canada

*Note all these BIG advantages in one cleaner*

- Wets, penetrates, loosens soil faster
- Works with hot or cold water
- Turns hard water soft
- Gives plenty of soil-lifting suds
- Rinses without spotting
- Easy on the hands
- Safe for all metals
- Economical



For more information, use coupon on last page.

**AUTOMATIC**

**100% SATURATED**

**ALWAYS READY TO USE**

# "Push Button" BRINE

**When You Want It...**
**Where You Want It...**
**With Lower Handling Costs**

So simple you'll wonder why it wasn't thought of years ago. So sound and practical, it fits any and all types of operations. Write, and our representative will show you how the LIXATE Process adapts to *your* plant. No cost, no obligation.

**INTERNATIONAL SALT COMPANY, INC.**
**INDUSTRIAL DIVISION, SCRANTON 2, PA.**

**SALES OFFICES:**
Atlanta, Ga. • Chicago, Ill. • New Orleans, La.
Baltimore, Md. • Boston, Mass. • St. Louis, Mo.
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Cincinnati, O. • Cleveland, O. • Philadelphia, Pa.
Pittsburgh, Pa. • Richmond, Va.

**ENGINEERING OFFICES:**
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*One Simple Installation . . .*
**HERE'S HOW THE LIXATOR WORKS**




**1.** Sterling Rock Salt is stored right in the hopper of the Lixator. Automatically, it feeds by gravity to the—

**2.** Dissolution Zone where water dissolves the rock salt to make 100% saturated brine.

**3.** Gravity then filters the brine through a bed of *un*dissolved rock salt and—

**4.** it flows, or is pumped, through the pipes directly to where you need it.

*The* **LIXATE*** *Process*
**FOR MAKING BRINE**
*Reg. U. S. Pat. Off.

# for lower cost control of moderately **Corrosive** fluids

Fig. 2651-A Gate

**JENKINS**

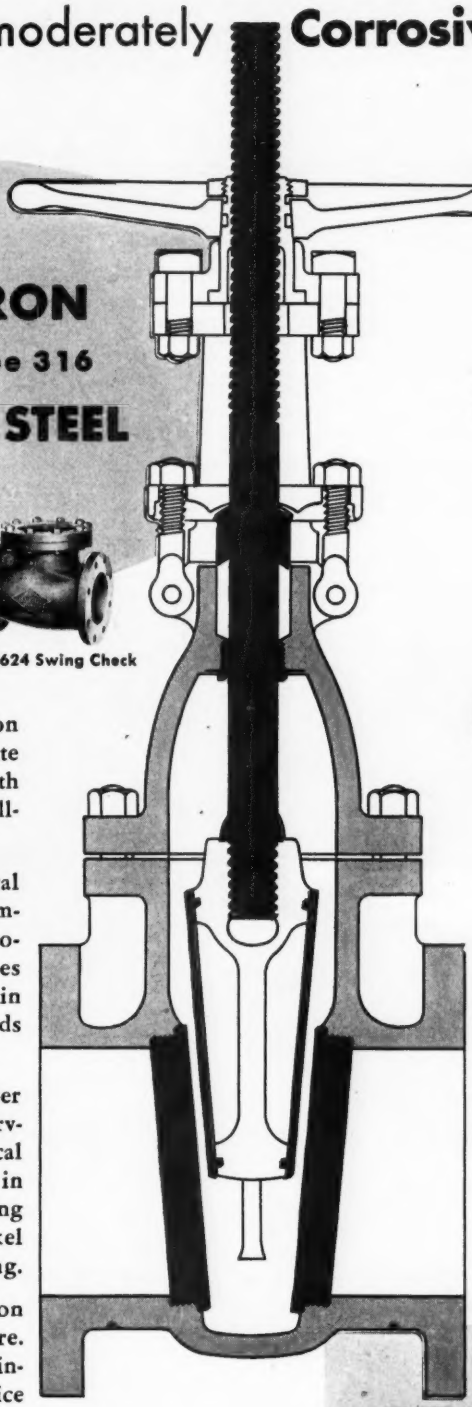
## NICKEL IRON

**Valves with Type 316**

## STAINLESS STEEL

**Trim**

Fig. 2624 Swing Check



***Every part in contact with fluid is the right metal to block corrosion and beat wear.***

**Cast NICKEL IRON**

- **BODIES** Heavy duty, dimensioned for greater resistance to wear and abuse. Through port design in Gate Valves.
- **BONNET** Rugged construction, like body. Swing-type gland bolts. Screwed-in back-seating bushing. Deep stuffing box.
- **YOKE** Integral with bonnet in 2" to 4" sizes.
- **WEDGE** In 10" to 24" sizes, with Stainless Steel Wedge Rings.
- **COVER** In Check Valve.

**Type 316 STAINLESS STEEL**

- SPINDLE
- GLAND
- BONNET BUSHING
- SPINDLE RING
- WEDGE PIN
- WEDGE RINGS Rolled into Nickel Iron Wedge in 10" to 24" sizes.
- SEAT RINGS
- DISC and HANGER in Check Valve

**NI-RESIST Type No. 2**

- WEDGE of I-beam structure is solid NI-RESIST in 2" to 8" sizes.

**PRESSURE RATINGS**

2" to 12"—200 lbs. O.W.G.
14" to 24"—150 lbs. O.W.G.

This combination provides corrosion resistance well above the moderate need in many processing services with an investment well below that for all-stainless steel valves.

Designed primarily for the chemical process industries, they are recommended for control of mildly corrosive liquids with minimum quantities of mineral acids, such as creosote in wood treatment, and many liquids carried in petroleum processing.

A major use is in pulp and paper processing, particularly in lines serving the digester, and in the chemical recovery cycle. Service records in lines carrying the valve-punishing "black liquor" give Jenkins Nickel Iron Valves top performance rating.

Jenkins *extra value* construction throughout. Get details — compare. See why they stretch your valve investment dollar — with longer service life, lower maintenance cost.

ALSO RECOMMENDED for fluids used in electroplating, photograph finishing, textile bleaching, dyeing and finishing and heat treating of metals.

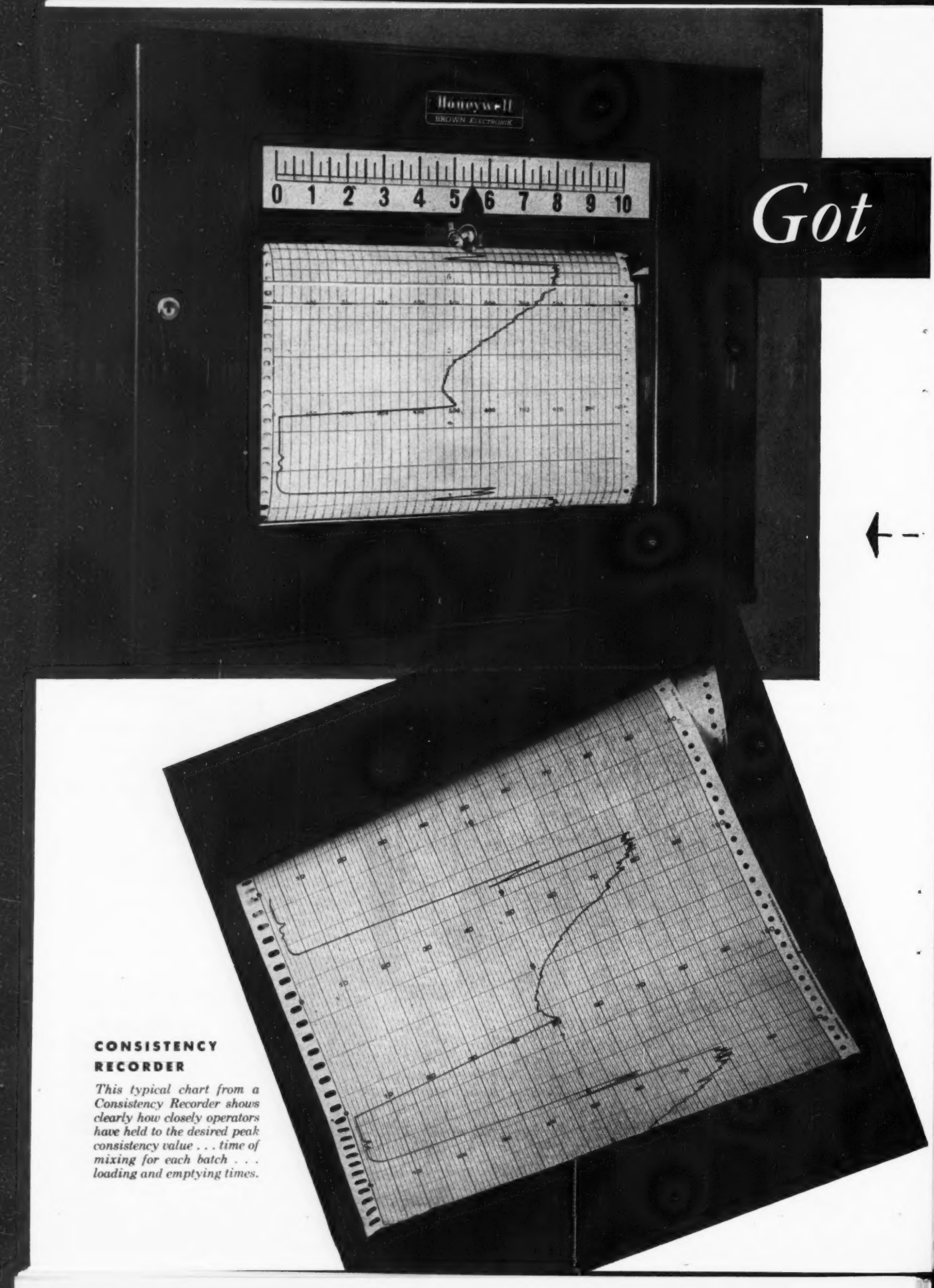
**GET COMPLETE SPECIFICATIONS from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17. Ask for Bulletin 118.**

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

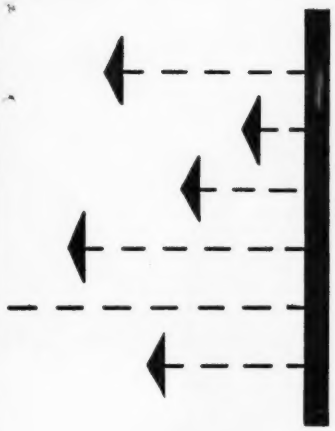



# Got

**CONSISTENCY RECORDER**

*This typical chart from a Consistency Recorder shows clearly how closely operators have held to the desired peak consistency value . . . time of mixing for each batch . . . loading and emptying times.*

# *a mixing process?*



## here's an accurate, sensitive way to measure consistency

WHEN MATERIALS are mixed, it is often desirable to bring the product to a specified consistency and stop the process as soon as the optimum point is reached. Over or under-mixing may detract from the texture, grain or volume of the finished product. Marked changes in consistency may also indicate the end point of a chemical reaction, which should be allowed to proceed no further once it has reached a predetermined phase.

For these applications the *ElectroniK* Mixture Consistency Recorder offers an automatic, accurate means of continuously measuring and recording the consistency of the material in your mixer.

### Measures Motor Input Power

It works on a simple principle. It measures the electrical power required to drive the mixer motor. When consistency increases, so does the drag on the motor. By recording the power input to the motor, a sensitive, readily reproducible measurement is obtained which is directly related to product consistency.

Operators find the *ElectroniK* instrument's record an easily understood index to process operation. They can see abnormal variations readily, and can tell exactly when the desired end point is reached. And management can use this same chart as a permanent record of production rates, machine stoppages and uniformity of processing.

Applicable to practically any mixer, the consistency recording system uses components that have been proved in thousands of industrial installations. Your nearby Honeywell sales engineer will be glad to discuss your specific application . . . and he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

● **REFERENCE DATA: Write for Data Sheet No. 3.6-7, "Dough Mixing."**

MINNEAPOLIS **Honeywell**
BROWN INSTRUMENTS
*First in Controls*

# Rubbish Disposal is only ONE of the Cost Cutting jobs for the Dempster-Dumpster in your plant...

It's amazing, almost to the point of fantasy, yet so soundly real, what the minds of men in all types of industry have cooked up for more efficiency and reduced costs with the Dempster-Dumpster.

Hundreds of plants are handling materials of practically every description with one truck-mounted Dempster-Dumpster serving scores of detachable containers. Here are just a few. Oils, gases, and liquids handled in our Tank Type Containers . . . tools and equipment in our Tool Shed Type Container . . . containers on casters placed for receiving steel chips from lathes or at conveyors for receiving finished products . . . container with doors and windows, replacing shacks for plant guards or nightwatchmen . . . containers built to handle chlorinator ash residue of approximately 1500° F. and there are dozens more.

Containers are placed wherever material accumulates. When loaded each is picked-up, hauled and emptied (as illustrated above) . . . or load set down intact. The entire operation is handled by only one man, the driver, by hydraulic controls in cab.

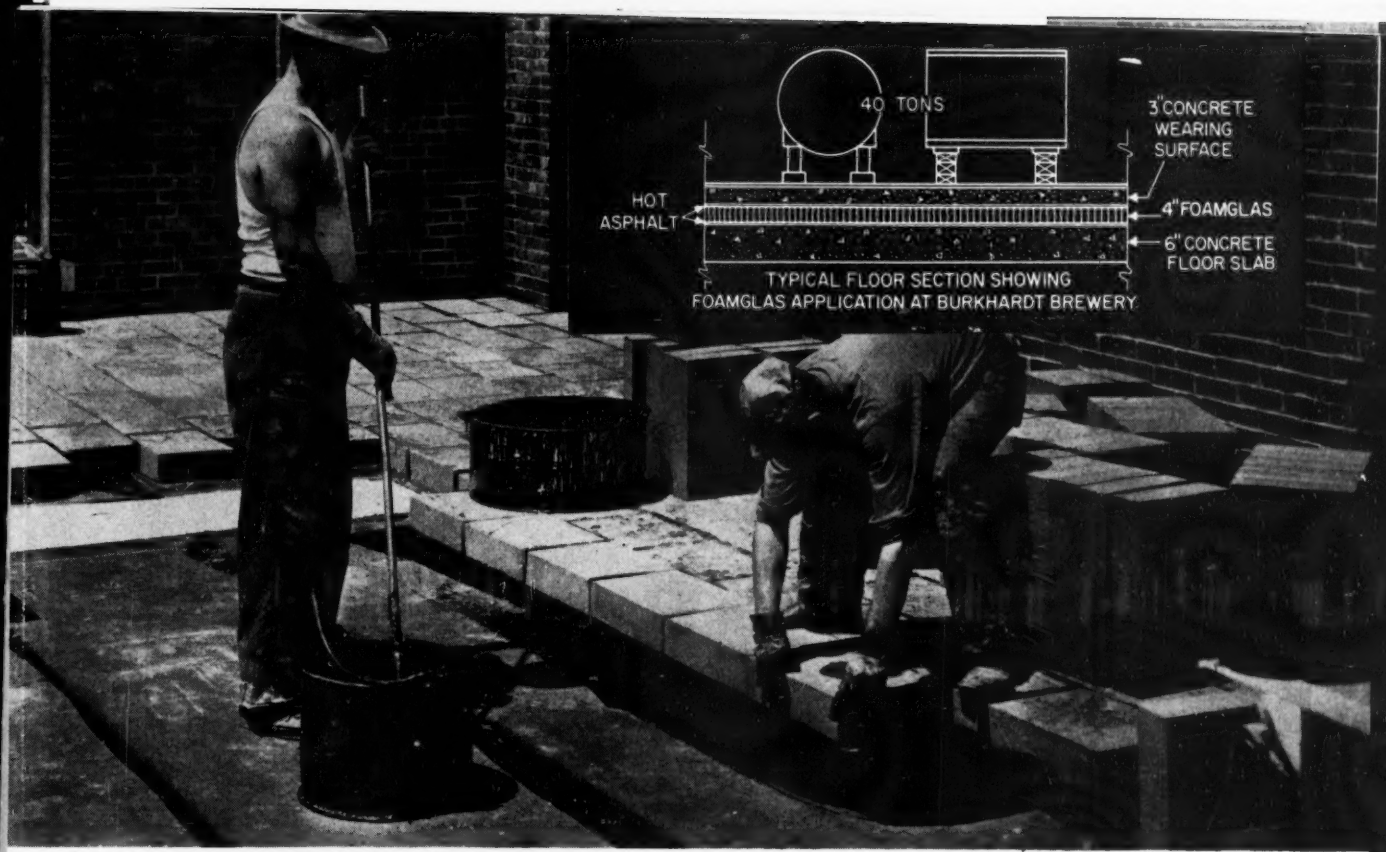
The containers are built in capacities up to 12 cu. yds. and each is designed to suit the materials to be handled—be they bulky, light or heavy . . . solids, liquids or dust.

One Dempster-Dumpster, with driver, does the work of 3 to 5 conventional trucks . . . eliminates trucks and crews standing idle . . . eliminates rehandling of materials and increases efficiency and good plantkeeping.

If you have even any remote idea that this equipment could be adapted to your operation, by all means contact us because being without the Dempster-Dumpster System could easily be costing your company thousands of dollars annually. Manufactured and sold exclusively by Dempster Brothers, Inc.

One Dempster-Dumpster Handles All Containers . . . . All Sizes . . . . All Designs

**DEMPSTER BROTHERS, 774 Shea Bldg., Knoxville 17, Tennessee**




# "Our FOAMGLAS floor insulation supports over 40 tons without breakdown!"

### reports Burkhardt Brewing's Chief Engineer, C. A. Frampton

"The extra strong structure of FOAMGLAS has been mighty valuable to us," says C. A. Frampton, Chief Engineer, Burkhardt Brewing Co., Akron, Ohio. "When we built our tube ice and refrigerated water storage room in 1949, we had to find an insulation that could take the heavy load concentration on the floor. We picked FOAMGLAS because we could count on its strength to stand up under the weight of two twenty-ton Vogt Tube Ice machines plus a 20′ x 30′ x 7′ steel tank filled with a water and ice mixture. Because of its long-life insulating protection, we used FOAMGLAS to insulate walls and roof, as well as the floor."

Frampton sums up: "Since we installed our FOAMGLAS in '49, it's lived up to and surpassed all basic specifications. We're more than satisfied with it."

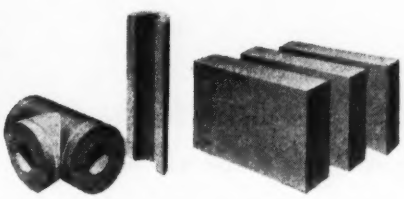
It'll pay you to check the many benefits that *you*, like Burkhardt Brewing, will get from FOAMGLAS, the *unique cellular glass insulation*. Only FOAMGLAS assures you of constant, long-life insulating protection . . . because its sealed glass cells cannot absorb the moisture that may cut the efficiency of ordinary insulations. What's more, FOAMGLAS is fireproof, acid-proof and vermin-proof . . . with extra strength and rigidity for a wide variety of design applications. So send today for a sample and our new booklet detailing the application of FOAMGLAS for cold storage uses.

Mr. C. A. Frampton

**PITTSBURGH CORNING CORPORATION**
Dept. O-74 One Gateway Center • Pittsburgh 22, Pa.

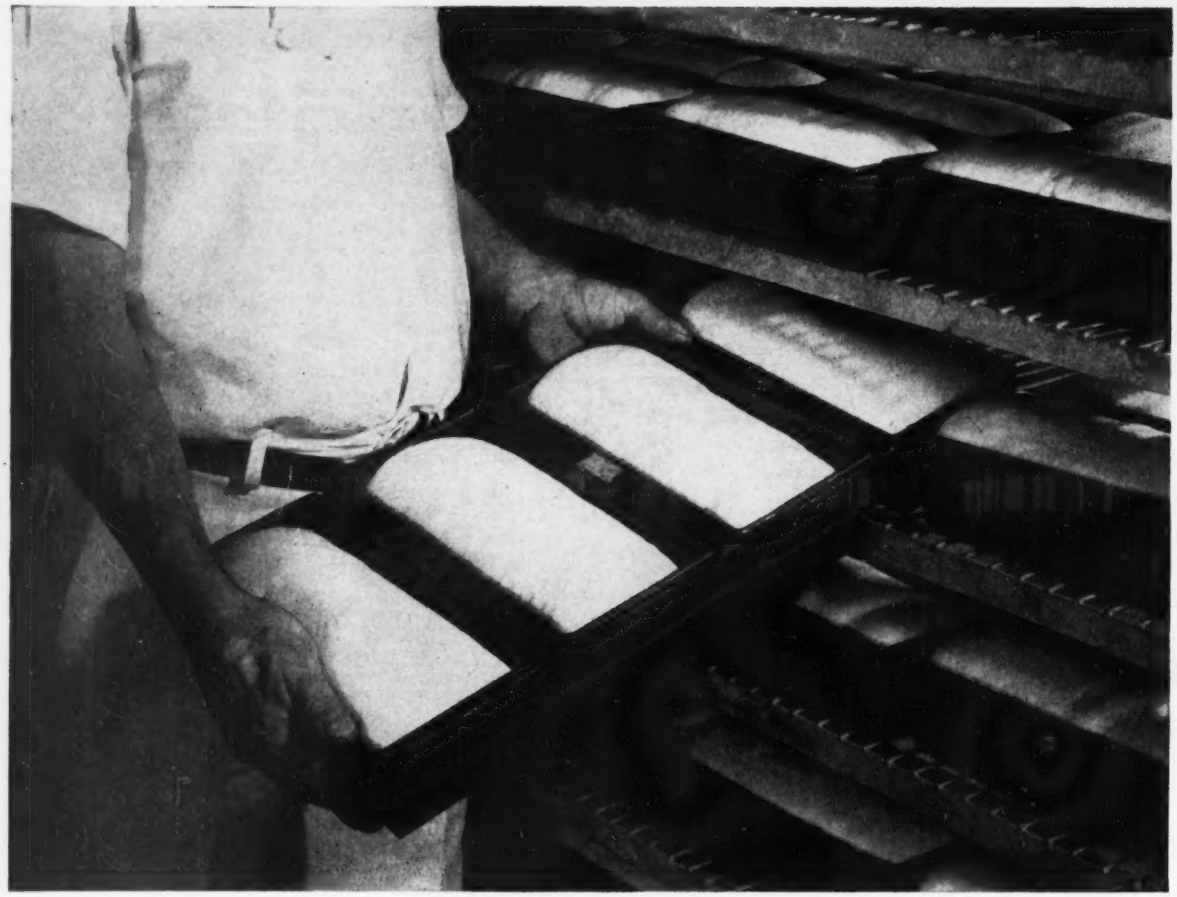
**FOAMGLAS®**

*the cellular, stay-dry insulation*



PITTSBURGH PC CORNING

**Pittsburgh Corning also makes PC Glass Blocks**



## What do you know about baking bread?

More than we do, doubtless, if you're a baker. But do you know about Myvatex Food Emulsifier?

We do—because we make it and know the experience of leading bakeries that use it. What it boils down to is this: Myvatex can help you make a better bread at less cost and in less time.

How does Myvatex do this? First of all, it's easier and faster to handle. Consistency is uniform and there's never any liquid separating out. Stores well even when warm. And it's a plastic fat that you don't have to melt or mix with water to use. Add it to the sponge mix or dough.

Then, Myvatex makes a silky, easy-to-work sponge. The dough leaves the mixing machine clean and fast, has better machinability and a smoother skin for molding. Its behavior is uniform.

With Myvatex Food Emulsifier, less sugar is consumed in proofing. You don't have to depend on proofing time for so much of the rise. You can bake at higher temperatures—either to speed the baking or to get a firmer crust.

Best of all, a Myvatex bread has the taste, looks, and feel that help it move off your dealers' shelves in a hurry.

Want a sample of Myvatex Food Emulsifier to try in your own shop? Just write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

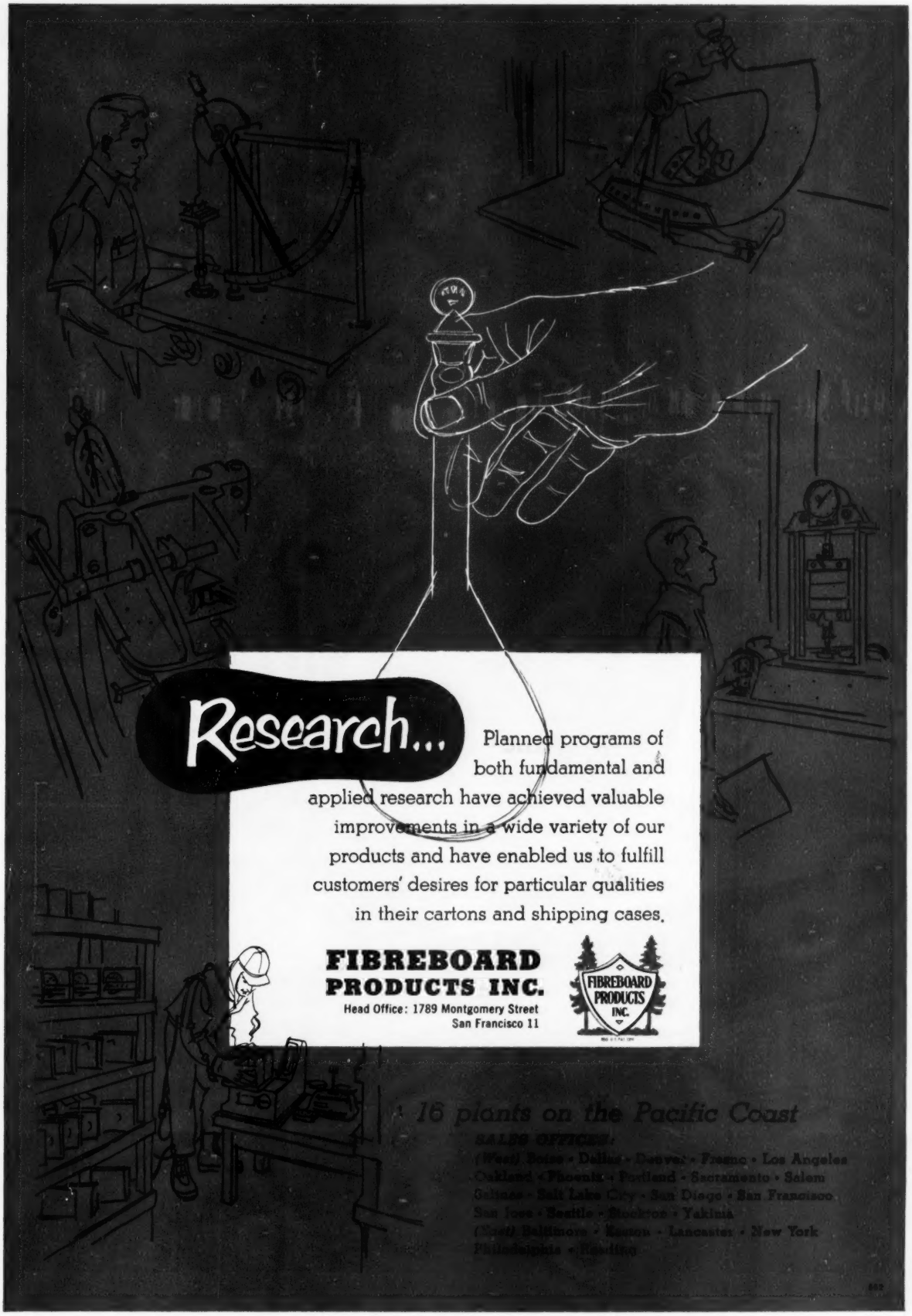
"Myvatex" is a trade-mark.

*distillers of monoglycerides made from natural fats and oils*

DPi

Also... vitamins A and E

**Distillation Products Industries** *is a division of* **Eastman Kodak Company**


Research...
Planned programs of both fundamental and applied research have achieved valuable improvements in a wide variety of our products and have enabled us to fulfill customers' desires for particular qualities in their cartons and shipping cases.
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For more information, use coupon on last page.

GOING UP...
Electric Motor

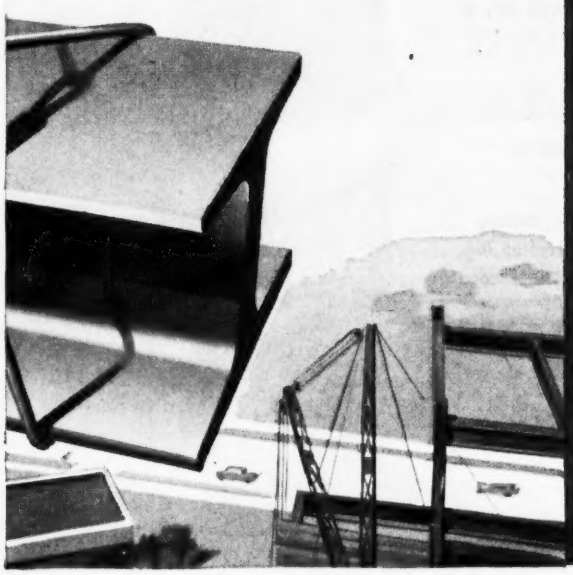
# Performance!

To a towering structure of design achievement Fairbanks-Morse adds still another outstanding member . . . a compact new enclosed motor . . . backed by an engineering tradition which has been a-building for more than a century.

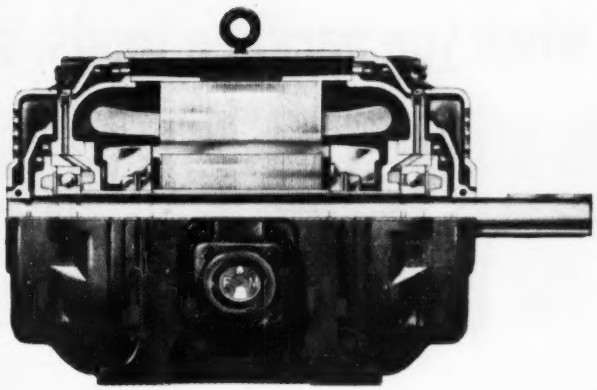
That tradition is
*More Performance in Less Space.*

You, as a buyer of electric motors, will benefit by that tradition . . . just as the users of Fairbanks-Morse diesel engines, pumps, scales, locomotives and the many other F-M products are today enjoying the advantages of finer performance.

Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Illinois.



## NEW FAIRBANKS-MORSE
## TOTALLY ENCLOSED FAN-COOLED MOTORS



**TOTALLY ENCLOSED**—Wherever adverse operating conditions are encountered, F-M totally enclosed construction effectively insures electrical parts and bearings against contamination by dirt, abrasive dusts, metal particles, corrosive gases and steam.

**DOUBLE-END VENTILATION**—Cooling air is drawn through guarded openings in both fan shields and uniformly circulated through cored passages surrounding the sealed inner shell. Efficient heat-transfer action insures uniform internal cooling. Exhaust air is discharged through bottom of frame—not across motor and driven machine.

**COPPERSPUN ROTOR**—Exclusive Fairbanks-Morse feature—an indestructible one-piece rotor—homogeneous, free from flaws for maximum strength and lifetime service.

**CONDUIT BOX**—New, gasketed, cast iron conduit box permits easy pulling of cables without insulation damage. Fairbanks-Morse exclusive: recess feature allows elimination of conduit box where space is limited.

**BEARINGS**—Precision ball bearings are effectively sealed against grease leakage and contain ample lubrication for extended periods of rugged service. Convenient means are provided for flushing and relubricating if desired. Cartridge bearing construction is standard on all larger ratings.

**FAIRBANKS-MORSE**
*a name worth remembering when you want the best*

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS




For more information, use coupon on last page.

# when you package foods, specify

# VISQUEEN® film "C"

## the ink stays on— it won't rub off

**VISQUEEN** is stronger—won't split, crack, shatter or run.
**VISQUEEN** is more uniform—yields more units per pound of film.
**VISQUEEN** won't block—keeps packaging lines at top speed.
**VISQUEEN** has body—packages are easily filled.
**VISQUEEN** is stable—won't get brittle, dry out.
**VISQUEEN** thickness is identified—on invoices and rolls.

Converters of **VISQUEEN** film will be glad to help you apply this superior product to your packaging lines. The coupon will bring their assistance.

**Important!** VISQUEEN film is all polyethylene, but not all polyethylene is VISQUEEN. VISQUEEN film is produced by process of U.S. Patents No. 2461975 and 2632206. Only VISQUEEN has the benefit of research and technical experience of The VISKING Corporation, pioneers in the development of pure polyethylene film.

VisQueen® film . . . a product of
**THE VISKING CORPORATION**
World's largest producers
of polyethylene sheeting and tubing
**Plastics Division, Terre Haute, Indiana**
**In Canada: VISKING Limited, Lindsay, Ont.**
**In England: British VISQUEEN Ltd., London**

**The VISKING Corporation, Box R7-1410**
**Plastics Division, Terre Haute, Indiana**

Send me names of converters of VISQUEEN film serving my area.

Name_____

Company_____ Address_____

City_____ Zone____ State_____



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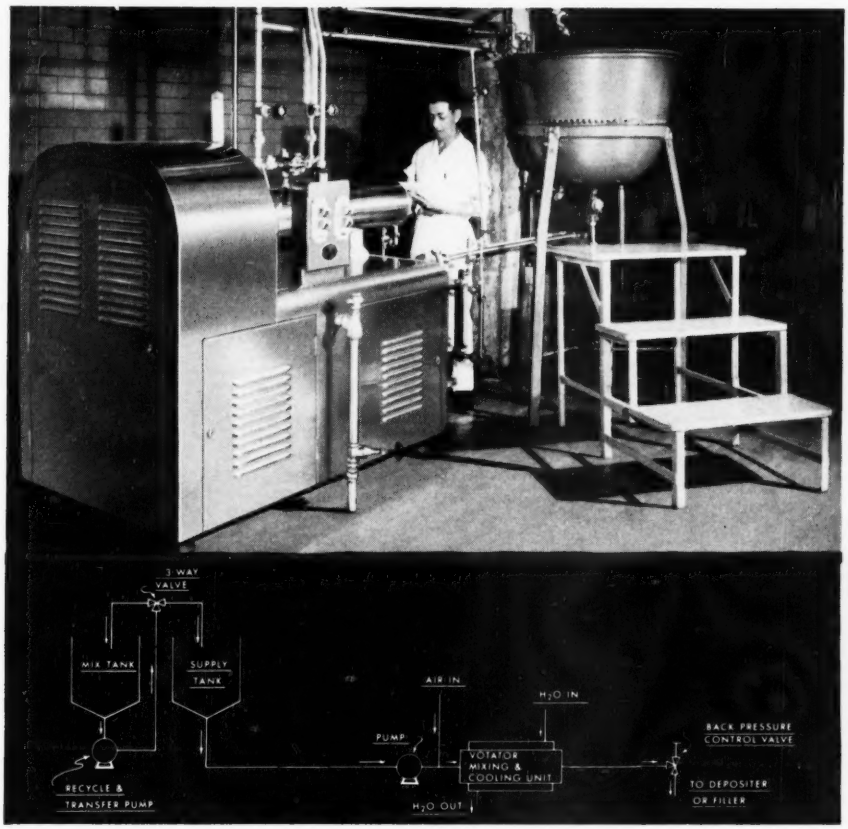
You get better efficiency and product quality with

# Votator® CONTINUOUS PROCESSING APPARATUS...




## Continuous processing improves marshmallow quality at Farm Crest Bakeries

MARSHMALLOW of just the right texture and quality is made continuously with VOTATOR* Marshmallow Apparatus at Farm Crest Bakeries, Columbus, Ohio. Here, marshmallow mix is *cooled and whipped* in a matter of seconds into a smooth, homogeneous product—light, velvety and sales-stimulating! The automatic, closed-system operation of VOTATOR Marshmallow Processing Apparatus is accurately controlled . . . insures absolute uniformity of every pound . . . just the way you want it.

Many installations like that of Farm Crest are now producing labor savings up to 66% and require only about half the floor space of conventional equipment. One, two and three-cylinder units are available with capacities from 350 to 1800 pounds per hour.

Whatever your products or processing operations, it will pay you to investigate the advantages of VOTATOR Continuous Processing Apparatus for perfect quality control and lower costs.

*VOTATOR—Trade-Mark Reg. U. S. Pat. Off.

FOR...

MIXING

PASTEURIZING

COOKING

STERILIZING

SLUSH FREEZING

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***Mail coupon for information***

The **GIRDLER** Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

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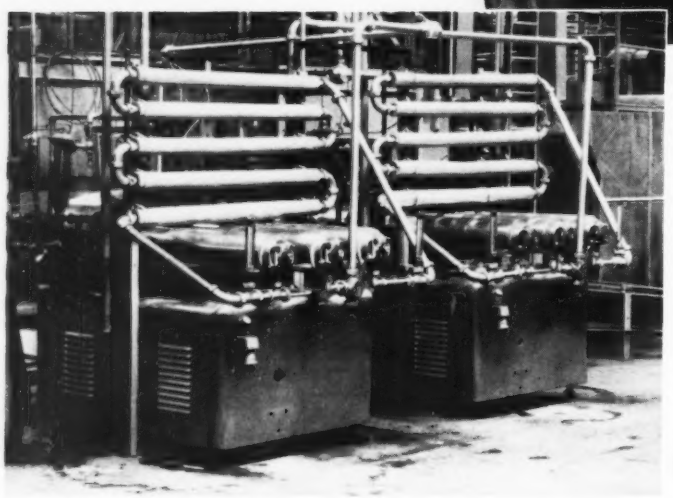
# GIRDLER

## SERVICE IS COMPLETE



## ...from process design to finished plant

*Continuous sterilization of strained foods at 280°F to 290°F with VOTATOR Heat-transfer Apparatus results in high quality production at low cost.*

TIME TO CALL on Girdler's complete service is when new construction or modernization of processing facilities is first planned. For Girdler has the extensive experience you need in all phases of the job . . . from process design and engineering to the application of necessary continuous processing equipment and plant construction.

To help you develop processes, Girdler offers cost-plus contracts covering preliminary work. This includes process recommendations and flow diagrams, general equipment specifications, plot plans, cost estimates, and operating cost data.

Let Girdler's broad experience in food processing simplify your planning . . . save valuable manhours . . . insure sound results! Write for this 32-page booklet which gives complete information on applications of VOTATOR Heat-transfer Apparatus. And, for the latest information on VOTATOR Marshmallow Processing Apparatus, ask for Bulletin V-227. Send coupon today for your free copy.

**THESE PRODUCTS CAN BE PRODUCED BETTER WITH VOTATOR CONTINUOUS PROCESSING APPARATUS:**

Marshmallows
Cake Batter
Dog Food
Chocolate Milk Drink
Edible Starch (For Salad Dressing)
Pie Filling
Soup
Lard
Margarine
Shortening
Sweetened Condensed Milk
Eggs
Concentrates, Fruits
Juices and Purees
Juice Concentrates
Starch Gum Jellies
Strained Foods

**THE GIRDLER COMPANY**
**224 East Broadway, Louisville 1, Kentucky**

☐ Send booklet V-39 describing Continuous Processing.
☐ Send bulletin V-227, "Marshmallow Processing Apparatus."

*Name* _____

*Position* _____

*Company* _____

*Address* _____

*City* _____ *State* _____

The **GIRDLER** Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

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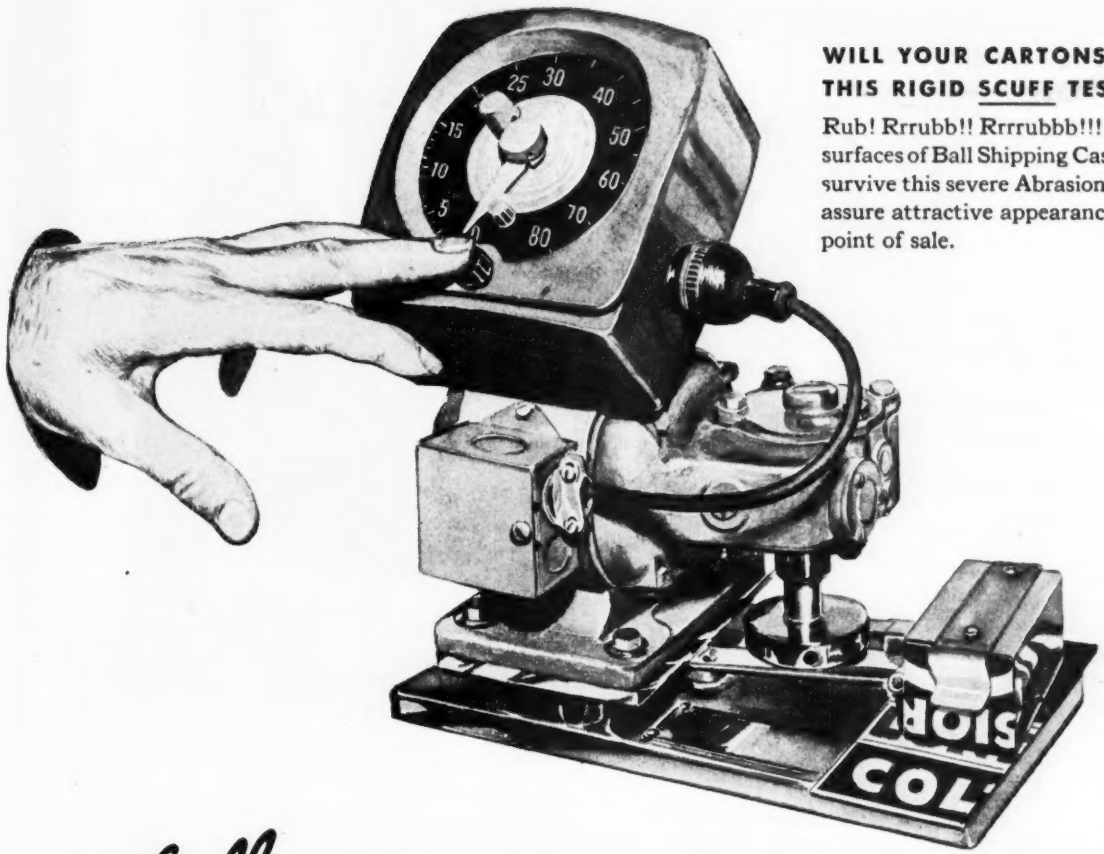
**VOTATOR DIVISION:** New York, Atlanta, Chicago, San Francisco



**WILL YOUR CARTONS PASS THIS RIGID SCUFF TEST?**

Rub! Rrrubb!! Rrrrubbb!!! Printed surfaces of Ball Shipping Cases must survive this severe Abrasion Test to assure attractive appearance at the point of sale.

# Ball GLASS CONTAINERS ARE BETTER PROTECTED!

Ordeals like this "scuff test" in our Packaging Research Laboratory prove the ruggedness of Ball Shipping Cartons. Every case must be able to withstand hard usage and keep neat looking *outside*, while protecting the Ball Glass Containers *inside*.

Such research also helps us to avoid wasteful "over-packaging." We use no more weight or strength than needed for ample safety. Since shipping cases often represent 25% of all glass container costs, you can save plenty by calling Ball . . . first of all!

## BALL BROTHERS COMPANY

*Offices in All Principal Cities*

**LET US SEND YOU** our new brochure, "The Door to Better Packaging." It contains interesting details of the many tests used to maintain carton quality and economy. Address Ball Brothers Co., Dept. FE 7, Muncie, Ind.

**CALL BALL FOR QUALITY GLASS CONTAINERS, METAL CLOSURES, AND PACKAGING ENGINEERING SERVICE**

© 1954, B. B. Co.

**PLANTS AT: MUNCIE, IND. • CHICAGO, ILL. (Closure Division) • HILLSBORO, ILL. • OKMULGEE, OKLA. • EL MONTE, CAL.**

# Why don't people stick to their diets?

Some diets fail because they are based on fads

Even good diets fail when people don't stick to them

Why don't people stick to their diets?

Because they can't overcome that "always hungry" feeling

Why are they hungry?

It may be because their blood sugar level is low

*Have you put aside your scale because your diet was too dreary?*

***The fastest way to raise your blood sugar level, keep your appetite satisfied with less, is to have some sugar—or one of the good things containing it.***

***A new approach to diet planning, based on recent research, helps healthy people hold down their waistlines by raising the blood sugar level.***

People have such a natural liking for sugar, it has always been one of the foods hardest to do without.

Now science finds that there is no need for any healthy person to do without sugar. In fact, your normal use of sugar may actually be helping to *keep you from gaining weight.* And if you want to lose weight, a moderate use of sugar as part of a well-planned diet can actually make it much easier for you to stick to your diet.

Why does eating a sweet just before a meal help keep you from eating too much?

Why does a simple dessert make a small meal so much more satisfying?

### *Science finds the reason*

That's because sugar raises your *blood sugar level* faster than any other food. New research at a leading university has shown that the blood sugar level plays a leading role in regulating appetite.

When the blood sugar level falls too low, the appetite regulating center of the brain (the hypothalamus or "appestat") turns on the appetite much as a thermostat turns on the furnace in your house. You're apt to eat more than you need, without being conscious of overeating, before your blood sugar level is raised to the point where it "shuts off your appestat."

### *New way to diet without hunger*

This discovery has already brought about an entirely new approach to weight control diets. It is based on keeping hunger *down* by keeping your blood sugar level *up* throughout the day.

You do not cut out any food, you simply *cut down.* To make it easier to cut down, you eat more often—with small mid-morning, mid-afternoon and bedtime snacks if you are hungry. But in all you do not eat nearly so much. You do not want so much.

**You do not substitute artificial no-calorie sweeteners for sugar. They can't help curb your appetite since they have no effect on your blood sugar level. Using them defeats your purpose.**

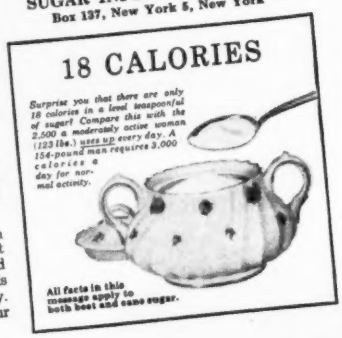
You may have a teaspoonful of sugar in your coffee or tea, or on your breakfast cereal or fruit. It supplies only 18 calories, can make it easier for you to turn down second helpings that would supply several times as many calories.

Because it makes a small meal so much more satisfying, you may eat desserts that include sugar with your lunch or dinner. And you may have an occasional between-meals sweet such as a soft drink or piece of candy. This is one of the *fastest* ways to satisfy your craving for food with the *fewest* calories.

### *More facts for weight watchers*

Scientific articles on the blood sugar level studies have been published just recently in Medical Journals. But already many popular magazines have begun to pick up the story with articles that show how you can have your sugar and your waistline, too. One of these recently appeared in *Reader's Digest.* If you would like a reprint of this article, plus other interesting facts about sugar write to:

**SUGAR INFORMATION, INC.**
**Box 137, New York 5, New York**


18 CALORIES
Surprise you that there are only 18 calories in a level teaspoonful of sugar? Compare this with the 2,500 a moderately active woman (123 lbs.) uses up every day. A 154-pound man requires 3,000 calories a day for normal activity.
All facts in this message apply to both beet and cane sugar.

**THE THIRD AD in Sugar's New Campaign faces up to the big problem faced by most reducers—how to stick to their diets.**

**It appears in LIFE—July 12, THE SATURDAY EVENING POST—July 24, LADIES HOME JOURNAL—August, NEW YORKER—August 21—LOOK, August 24.**

**It also appears in 39 leading metropolitan newspapers the week of July 5.**

# NEW TREND

## Dieters are now being told, "Stay with Sugar—the real article. It's nature's real aid to weight control"

Sometimes new ideas about a product catch on gradually.

Sometimes they spread like wildfire.

That's what's happening now on sugar.

A year ago, the facts about sugar's new-found role in appetite and weight control were known only to a small circle of nutritional research people.

Since the start of the Sugar Industry's advertising program, millions of healthy people have learned that they can be slim and still enjoy sugar.

This program is just beginning to roll, but it's already been acclaimed as one of the outstanding food campaigns of recent times. It has won the support of all quarters of the food and beverage industry.

One reason is that there never was news of greater importance about *any* food product—news that affected *so many* products—news that people were more anxious to hear or ready to believe.

Another reason is that the discovery on which this advertising is based has started a new trend in diet planning. New, easier-to-stick-to diets, now beginning to appear in magazines and newspapers, give greater prominence to sugar-containing foods and beverages.

This new trend will do much to help shape new, more favorable attitudes about the foods you make, distribute or sell.

**SUGAR INFORMATION, INC.**
**New York 5, New York**

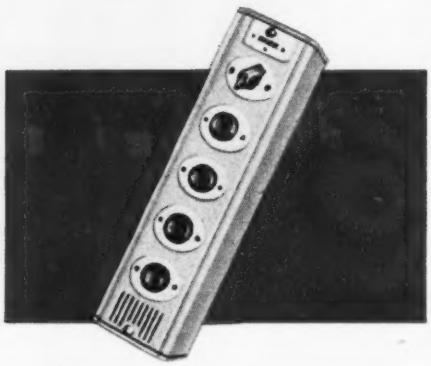


For more information, use coupon on last page.

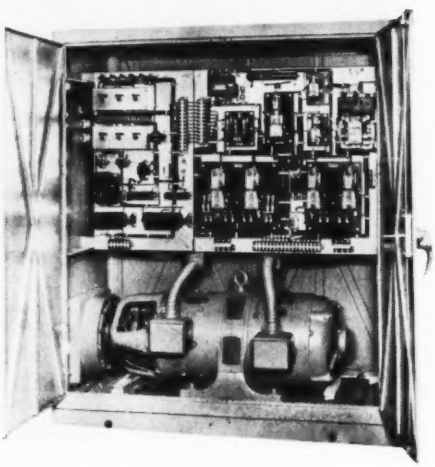
# DIAL THE SPEED—CONTROL THE PROCESS

## with a Performance Rated® Century SELECTIVE SPEED DRIVE

- **Offers automatic control integrated with your process.**
- **Covers a wide speed range—forward or reverse.**
- **Starts, stops—fast or slow.**
- **Allows forward or reverse jogs.**
- **Controls one or more motors.**

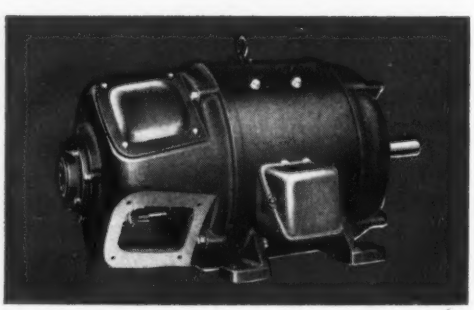


With a Century Performance Rated Selective Speed Drive, you can often integrate speed changes to cycle automatically as the process requirements dictate.



- You can automatically regulate metal cutting for optimum cutting speeds.
- Make the speed change automatically sensitive to changing temperature or pressure.
- Make the speed change automatically sensitive to changing diameter of a feed roll.
- Make the speed change automatically sensitive to the viscosity of a mix.
- You can use many different kinds of control devices in the control circuit to change speeds ... to jog ... to apply dynamic braking, etc.

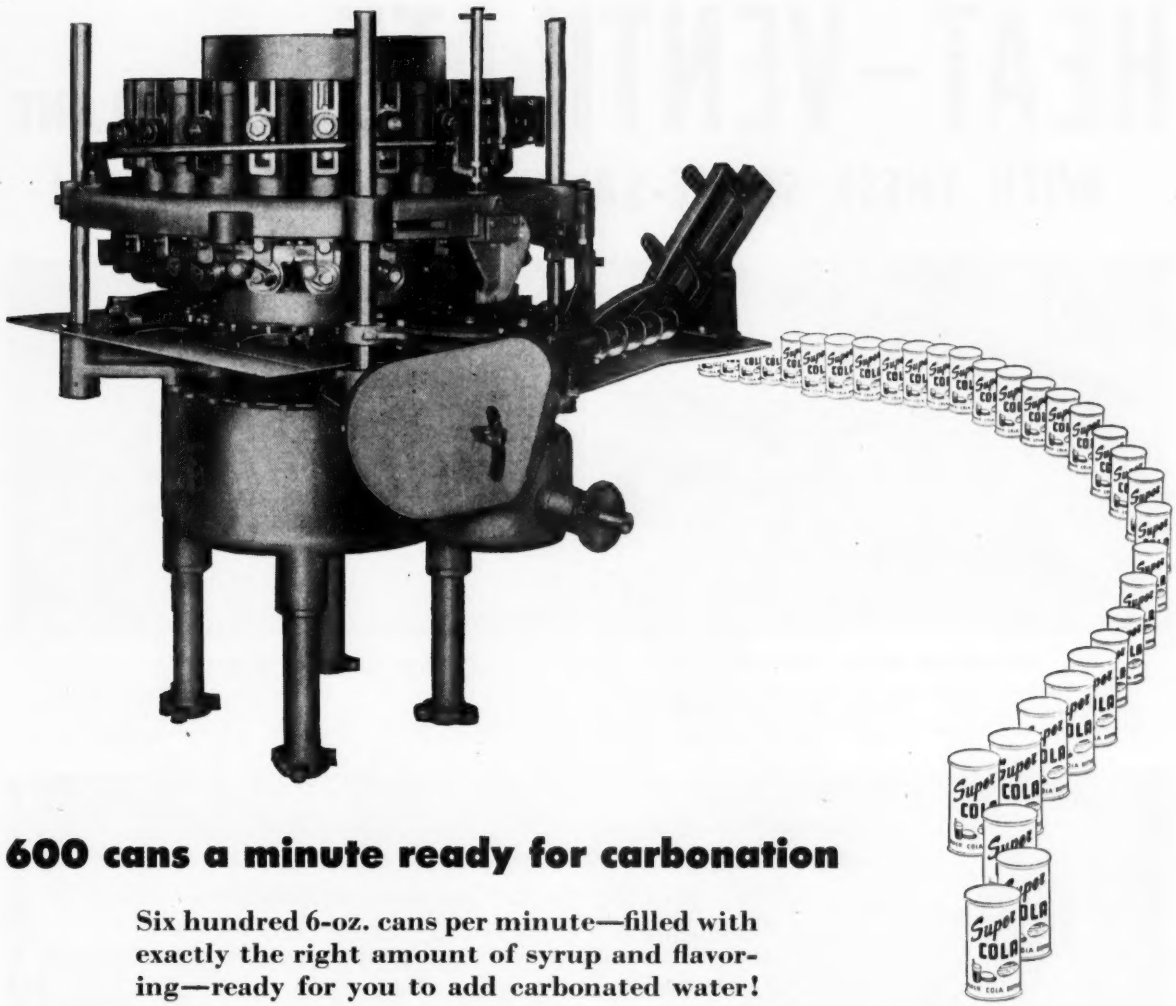
You're welcome to full information on your specific drive problem. Call your nearest Century District Sales Office or Century Authorized Distributor, or write direct. See telephone listings.



Century makes A. C. and D. C. motors 1/8 to 400 H. P.

Century Motors

**CENTURY ELECTRIC COMPANY**
**1806 Pine Street, St. Louis 3, Missouri**
*Offices and Stock Points in Principal Cities*




## 600 cans a minute ready for carbonation

**Six hundred 6-oz. cans per minute—filled with exactly the right amount of syrup and flavoring—ready for you to add carbonated water!**

That's the speed you get when you use this Pfaudler 21-piston rotary filler for prefilling cans. Accurate as a medicine dropper—but infinitely faster—it drops exactly two ounces (or whatever amount you desire) of syrup and flavoring into each can. The machine turns out 10 cans every second, ready for the final filling with charged water.

You can profit from the experience of many producers who are using Pfaudler equipment for filling syrup and many other products. Speed . . . accuracy . . . and the easy cleaning for which Pfaudler equipment is famous assure you of fast, smooth production.

To learn all the facts about Pfaudler high-speed fillers and other equipment for beverage plants, write today for your free copies of Bulletins 911 and 913. Check coupon below.

**Pfaudler**

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

THE PFAUDLER CO., Dept. FE-7, Rochester 3, N. Y.

Please send me a copy of ☐ Bulletin 911, ☐ Bulletin 913.

Name_____

Title_____

Company_____

Address_____

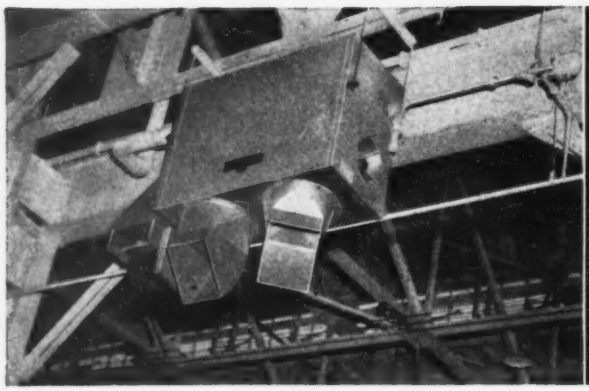
City_____ Zone____ State_____



For more information, use coupon on last page.

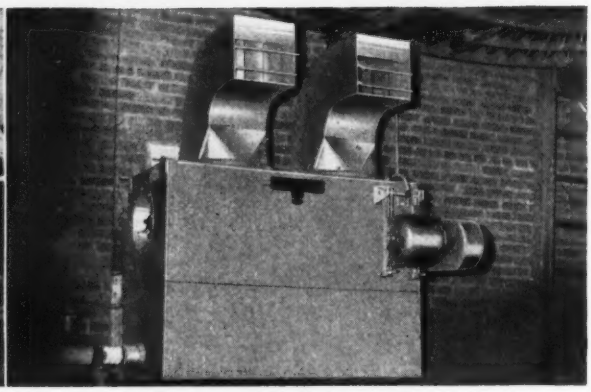
# HEAT–VENTILATE YOUR PLANT

## WITH THESE SPACE-SAVER "BUFFALO" UNITS!



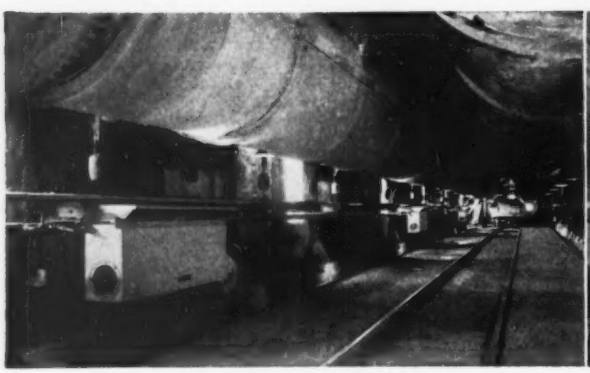
**NO FLOOR SPACE REQUIRED**

with a "Buffalo" Suspended Lowboy Unit Heater. Easily mounted in roof trusses. Spreads abundant, low-cost heat where you need it. Provides ventilation in warm weather.



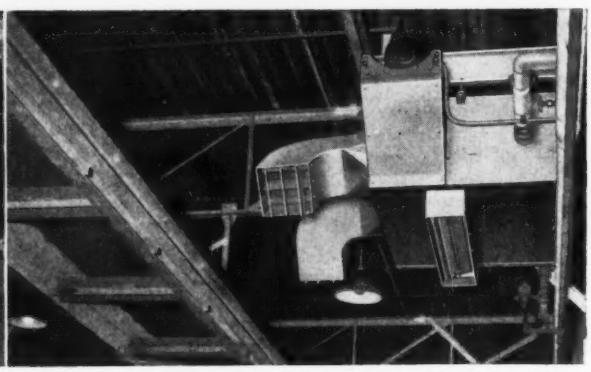
**FRESH, CLEAN WARM AIR**

(or cool outside air) is delivered by a compact "Buffalo" Highboy Unit with fresh air filtered intake through side wall. Bearing bowl at left permits easy external lubrication.



**LOW OVERHEAD – HIGH EFFICIENCY!**

Wall-mounted Lowboys provide plenty of heat even where quarters are cramped. New coil design increases heating surface, with narrower coil section. Coils are non-freeze.



**SWIVEL OUTLETS "AIM" FLOW**

accurately — a "Buffalo" efficiency feature. Others are "Buffalo" mixed-flow fans with unusually stable performance — standardized parts — lifetime construction.

**Let us show you NOW how low-cost and easy it is**

to heat and ventilate your plant. Bulletin 3704-A gives all details on the units to handle your heating — ventilating — makeup air problem. Handy chart gives you air diffusion distances for each unit and capacity up to 35,000 cfm.

*Write for Bulletin 3704-A Today!*

"Buffalo"

**BUFFALO FORGE COMPANY**

152 MORTIMER ST. BUFFALO, NEW YORK

*PUBLISHERS OF "FAN ENGINEERING" HANDBOOK*

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

PRESSURE BLOWING COOLING HEATING FORCED DRAFT VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING

# your newest sales-builder... "SWEET" PAPER BOARD for shipping boxes

Now your shipping boxes can *help* your sales instead of *hindering* them. From the paper industry comes sweet-smelling, deodorized board for boxes.

You no longer need to worry about "pick-up" of off-odors spoiling your products. Instead, the paper industry furnishes you with a board containing Monsanto Ethavan or Vanillin. Why take a chance that could lose sales? Next time, specify board containing these Monsanto products and end your worries about odor "pick-up."

For the names of manufacturers of "sweet" paper board, call your nearest Monsanto office or write Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Box 478, St. Louis 1, Missouri.

*Ethavan: Reg. U. S. Pat. Off.*

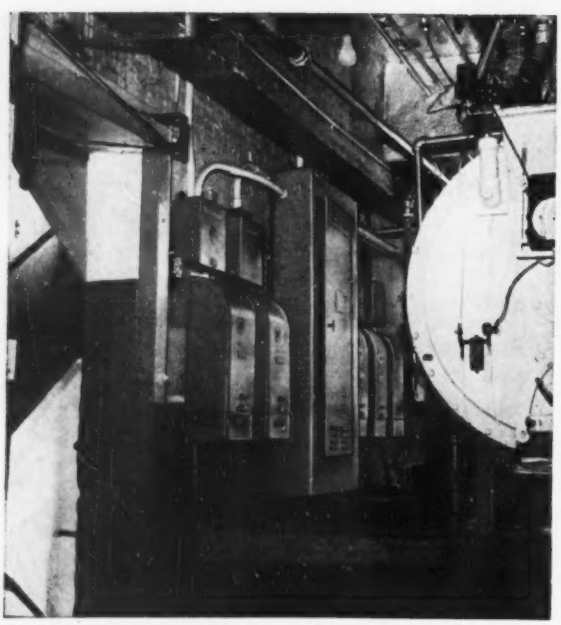
MONSANTO
CHEMICALS – PLASTICS
SERVING INDUSTRY... WHICH SERVES MANKIND



For more information, use coupon on last page.

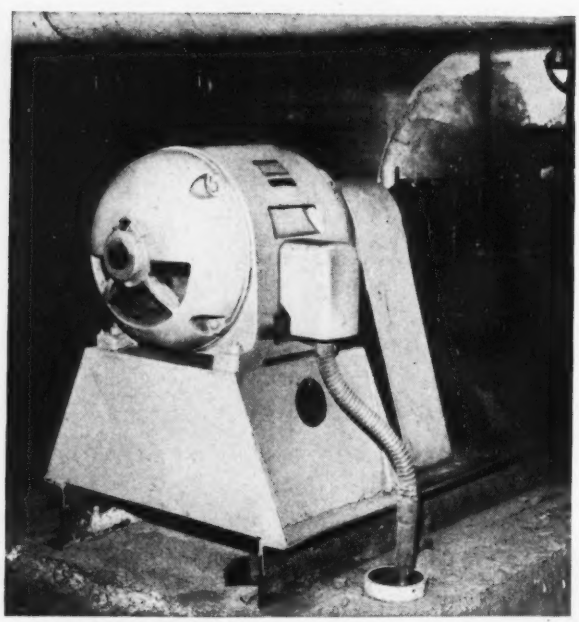
**TOUGH, VERSATILE TRI-CLAD* MOTOR** can be installed anywhere—will provide top performance and long life even under the most difficult operating conditions. Here the G-E drive is mounted on top of the five-roller refiners at Rockwood's Brooklyn plant. The Tri-Clad motor is controlled through G-E equipment conveniently mounted on rear wall.

# Rockwood Chocolate Co. finds G-E drives

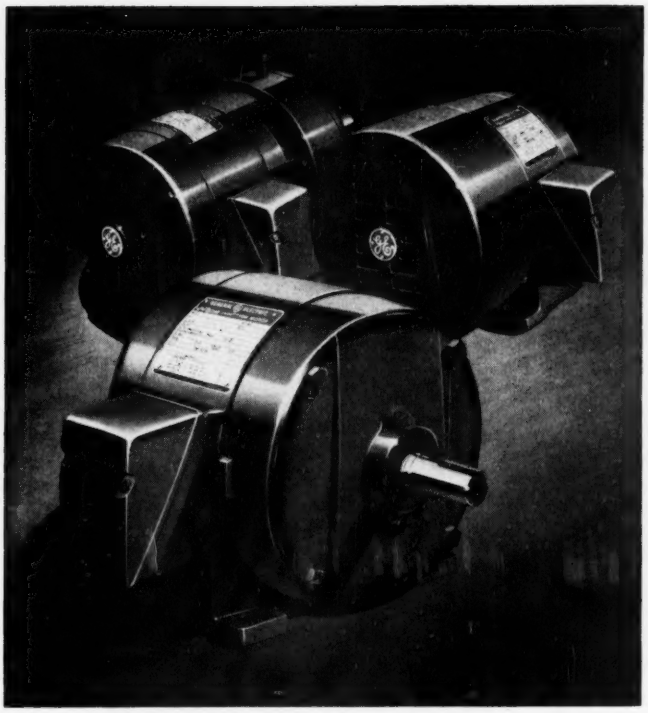


**COMPACT G-E CONTROL EQUIPMENT** is delivered pretested and factory assembled for easy installation. Operation of these grinders is virtually automatic.

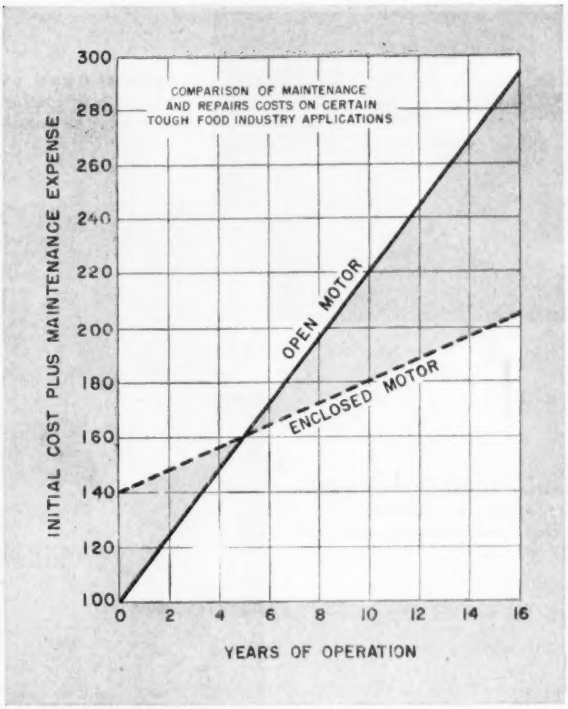
*Reg. Trade mark of General Electric Co.



**PROPER MOTOR SELECTION** can mean long-term savings. Let G-E engineers show you where the Tri-Clad dripproof motor can do the job or where the enclosed motor should be used.



**EVEN LONGER MOTOR LIFE** provided by the new Tri-Clad '55' line of gear, dripproof and enclosed motors. A new bearing and grease system greatly reduces maintenance.




**YOU SAVE MONEY** with the proper motor enclosure. Under tough conditions, in spite of its lower initial cost, an open motor may cost more in the long run than a totally enclosed.

# pay off under all operating conditions

## "We have experienced long dependable service and low maintenance costs with General Electric drives"—Rockwood Operations Manager

"G-E motors and control are used throughout our plant," says W. E. Ivory, Operations Manager of Rockwood Chocolate Company's big Brooklyn plant, "and we have yet to find an application where they cannot perform the duty." Operating in temperatures ranging from 60° F to 110° F, these G-E drives are giving Rockwood long-term savings.

In Rockwood, as in many food processing plants across the nation, Tri-Clad* motors are giving manufacturers extra years of dependable service. Now, in the first complete redesigning in almost fifteen years, G-E product engineers have developed the new Tri-Clad '55'* motor. This revolutionary motor has all the advantages of the G-E motors installed at Rockwood plus many other significant benefits for the food industry. *Up to 30% lighter and 50% smaller, the new motor has a greater resistance to moisture and improved bearing lubricants. And its greater efficiency gives you higher full-load speed, less power loss.*

G-E application engineers can save you money by helping you select the proper motor enclosure for the specific conditions in your plant. They can determine which of your operations can use open motors, as shown here at Rockwood, and which operations may best be performed by totally-enclosed motors. Although the initial cost of an enclosed motor is slightly higher, its significantly lower maintenance cost may mean long-run economy for you in your tougher applications.

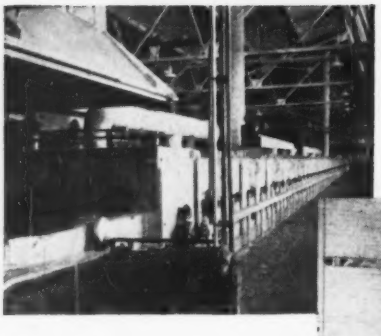
*The new Tri-Clad '55' motor is just one of the many electrical components developed by G-E engineers that can prove valuable to you.* When planning your next electrical system take advantage of G.E.'s wide experience. Contact your nearest Apparatus Sales Representative or write for Bulletins GEA-6013 on Tri-Clad '55' dripproof or GEA-6012 on Tri-Clad '55' enclosed motors. Section 652-16, General Electric Company, Schenectady 5, New York.

**Engineered Electrical Systems for Food Processing Plants**

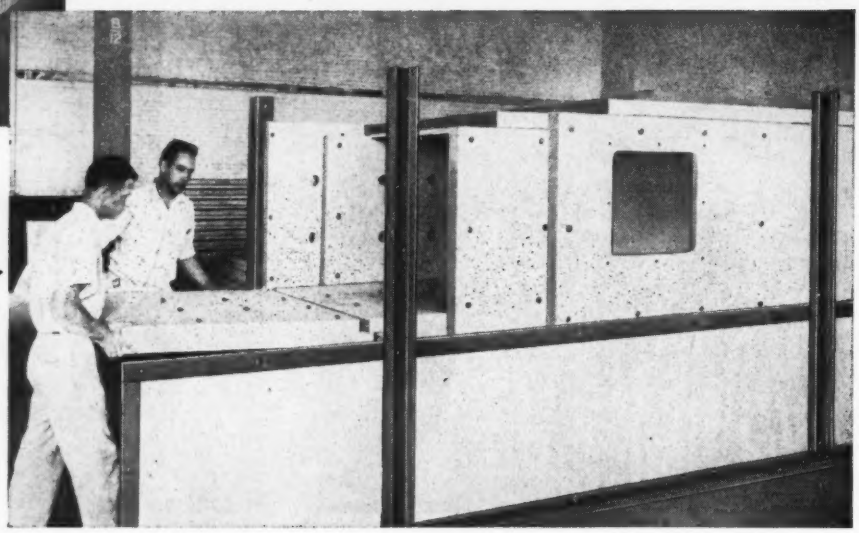
**GENERAL ELECTRIC**



For more information, use coupon on last page.



**Typical band oven** built with Marinite insulation. Insulation engineering by Johns-Manville.



**Mechanics assembling** a Marinite bakery oven. Marinite is used both as the structural and insulating material.

# Modern bakery band ovens are *Built* and *Insulated* with one material . . . J-M MARINITE

When leaders in the baking industry look for ways to improve band-oven performance, they realize that efficient insulation is a primary requirement. Johns-Manville provides the answer to this need with J-M Marinite*, the *structural* insulating material. Marinite improves band-oven performance in three important ways:

**1. Cuts fuel bills**—because it is an efficient thermal insulation . . . heat loss through Marinite oven walls is very slight. Fuel savings are substantial, for ovens of this type operate 24 hours a day, at temperatures up to 700F.

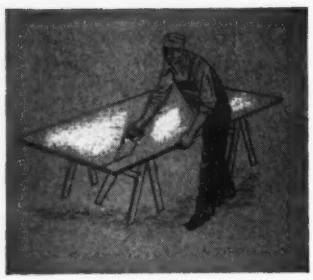
**2. Improves temperature control**—because it eliminates almost all through-metal fasteners and reduces the need for structural supports. Marinite construction provides uniform temperatures throughout the oven without local hot spots.

**3. Reduces maintenance**—because it is entirely unaffected by the high humidity and corrosive organic gases commonly prevalent in band ovens. Installation costs are also lower than with former methods of construction.

The Marinite oven installation illustrated here is but one example of how Johns-Manville insulating materials and Johns-Manville insulation engineering services are teamed with industry to develop improved processes and more efficient equipment. If you would like more information about Marinite Insulation and its application to your product or plant equipment, write Johns-Manville, Box 60, New York 16, New York. In Canada, 199 Bay Street, Toronto 1, Ontario.

JOHNS-MANVILLE JM PRODUCTS

*Reg. U. S. Pat. Off.



**Marinite** is an asbestos insulating material that combines great structural strength and excellent thermal characteristics. It is durable . . . proved in years of field experience. It is workable . . . can be fabricated with woodworking tools . . . can be cut, punched, shaped to fit. Also available fabricated to your specifications, ready to assemble.

## Johns-Manville *FIRST IN* INSULATION

MATERIALS • ENGINEERING • APPLICATION

# 1 out of 4 is a prospect for

# SUCARYL®

(CYCLAMATE, ABBOTT)

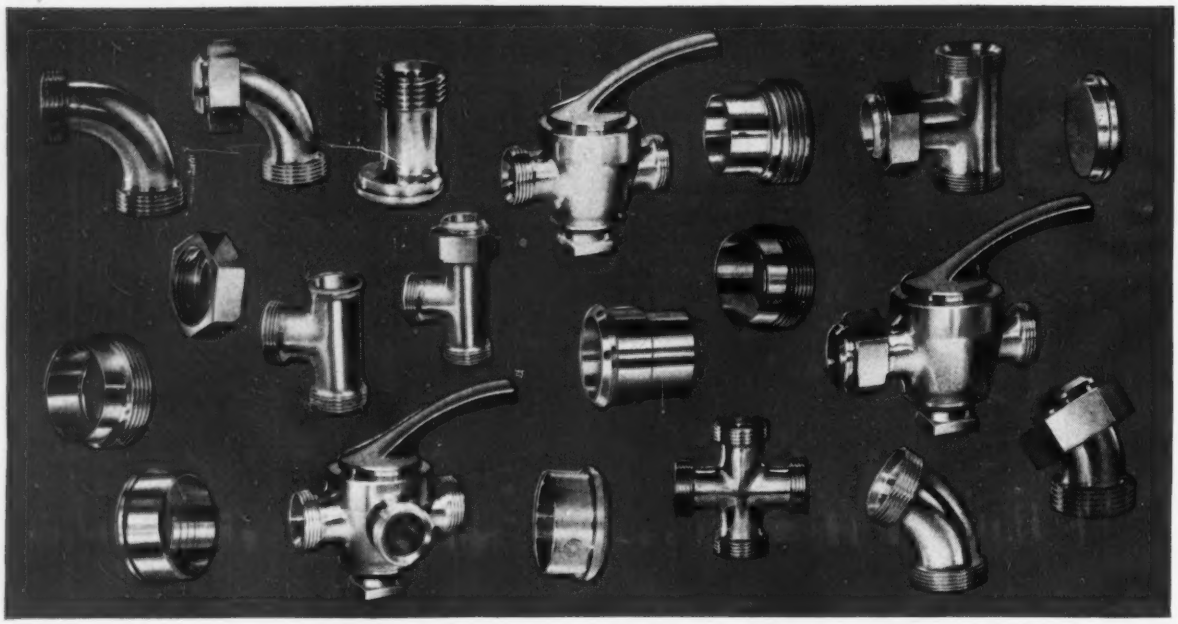
**...and for you!** With 36,000,000 overweight and diabetics in the nation, your market for low-calorie foods is already made. One out of every four people won't (or can't) eat regular sugar-sweetened foods. They're looking for products sweetened with non-caloric SUCARYL!

SUCARYL has been pre-sold to them through widespread newspaper and magazine publicity. They know the name. And they know the advantages: the full clean sweetness without calories, the sugar flavor without tell-tale bitterness. Many of them are already using SUCARYL in their homes.

Why hesitate any longer? Capitalize now on the increasing trend towards SUCARYL-sweetened foods. Right now, with big growth ahead in the dietetic field, is the time to begin. Write today to Chemical Sales Division, Abbott Laboratories, North Chicago, Ill. Abbott

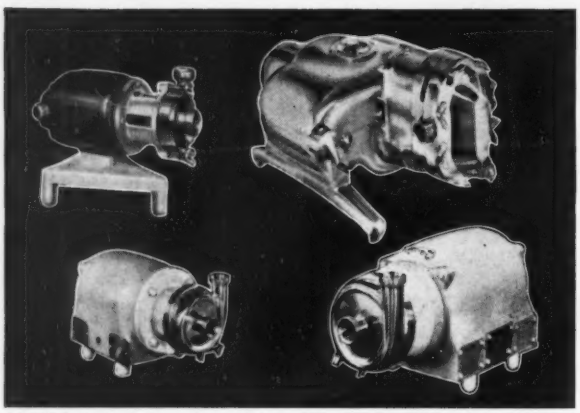


For more information, use coupon on last page.

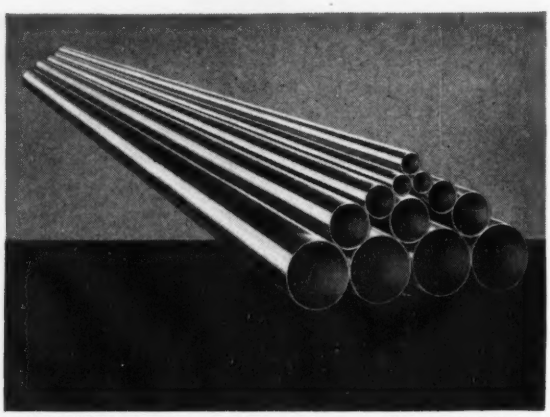


# You name 'em...You can have 'em!

One picture, 'tis said, is worth 10,000 words. That's why we're jamming as many stainless steel fittings as possible into the above photo. Without Cinerama we can't get 'em all in. The point is, though, that we do have as complete a line of sanitary fittings as you can find — *anywhere*. What's more, they're *in stock*... ready for delivery, from branches and distributors conveniently located throughout the country.



**PUMPS?** The famous "Flexflo" centrifugal and "Waukesha" positive types are available in both 304 and 316 stainless . . . in a variety of capacities . . . for pumping against low, intermediate and high pressure heads. *All in stock* . . . for quick shipment.



**NAME YOUR SIZE.** Our sanitary tubing . . . *all in stock.* Polished 180 grit I.D. and O.D. Comes in a variety of lengths and sizes: 1-inch in both 20 and 10-ft. lengths; 1½ and 2-inch in 21 and 10-ft. lengths; 2½, 3 and 4-inch in 10-ft. lengths. Other lengths and finishes available on special order.

**HERE'S HOW TO GET THE WHOLE STORY**

**CHERRY-BURRELL CORPORATION**
427 W. Randolph Street, Chicago 6, Ill.
*Equipment and Supplies for Industrial and Food Processing*
FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES

CHERRY-BURRELL CORPORATION
Dept. 117, 427 W. Randolph St.,
Chicago 6, Ill.

Please send ☐ Flexflo Pump Bulletin. ☐ Waukesha Pump Bulletin.
☐ Sanitary Fittings Bulletin. ☐ Have representative call.

Name .....
Firm .....
Address .....
City ..... Zone ..... State .....



For more information, use coupon on last page.

# B. F. Goodrich announces

# No need to scour this belt— it's Koroseal, and washes like glass

JUST a quick wipe with a damp cloth, and the belt on that icing table will be as clean as glass. That's because it's Koroseal, one of the new conveyor belts just developed by B. F. Goodrich for food handling.

Belts made of Koroseal flexible material have a smooth, polished surface. It's so tough that food particles can't grind into it. Sticky icing, jelly, most stains come off with a damp cloth. Or you can use detergents and water as often as you wish. Either way, cleaning time is cut in half. Since Koroseal is completely, permanently waterproof, the belt cover never gets damp or soggy, and so can be used right after washing.

Koroseal resists cracking and peeling, doesn't get sticky. And there's no danger of contamination with Koroseal because it is nontoxic, and has no odor or taste to transfer to foods. With its high resistance to cooking oil, animal fats, and most acids, the new Koroseal belt is ideal for bakeries as well as places where meats, nuts, greasy pans are handled.

Some of the other new belts, developed by B. F. Goodrich for food handling, include a very thin, white Koroseal belt for use in cooling tunnels, and two belts, called Highseal and Kleenseal, that are made of new types of rubber compounds. Their "sight-saving" green color reduces glare and eye strain on packaging and inspection lines.

It will pay you to find out more about these work-saving, money-saving improvements in food handling. First step is to have your BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. If you don't know the distributor nearest you, write us and we'll send his name. *The B. F. Goodrich Company, Dept. M-275, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

**B.F.Goodrich**
**INDUSTRIAL PRODUCTS DIVISION**



For more information, use coupon on last page.

# This "MICROSIEVE" is a perfect roadblock that guards the quality of many fine foods

No unwanted solids can pass this Dicalite filtercake—yet you get high throughput for full production. The reason is simple: only 10% of the filtercake is solid; 90% is voids, voids so tiny that even particles down in the colloidal and bacterial range can't get through. Decolorizing clays and activated carbon are caught and held; every trace of catalyst is removed from hydrogenated oils and fats.

For brilliant clarity and purity of filtered liquids; for greater stability of finished product; for lower filtering costs; Dicalite Filteraids have no superior. Impartial laboratory tests and the experience of many food processors support this statement. Dicalite Filteraids are produced from the nation's highest-grade deposits of diatomite and are processed under strict quality controls to set a new high standard of excellence in diatomaceous filteraids.

For more complete data on filtration, write for Bulletin B-12.

Dependable GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

**DICALITE DIVISION,** GREAT LAKES CARBON CORPORATION, 612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA

# Satisfaction rests on the carton

The sides of your corrugated shipping container add up to millions of valuable advertising display panels. Use them to merchandise your product at all levels of distribution. John Sexton & Company is one of many Union customers whose corrugated boxes are sales tools as well as shipping containers. Ask to see what award-winning Union package designers can do with *your* corrugated container.

TRADE MARK
UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

**UNION BAG & PAPER CORPORATION**

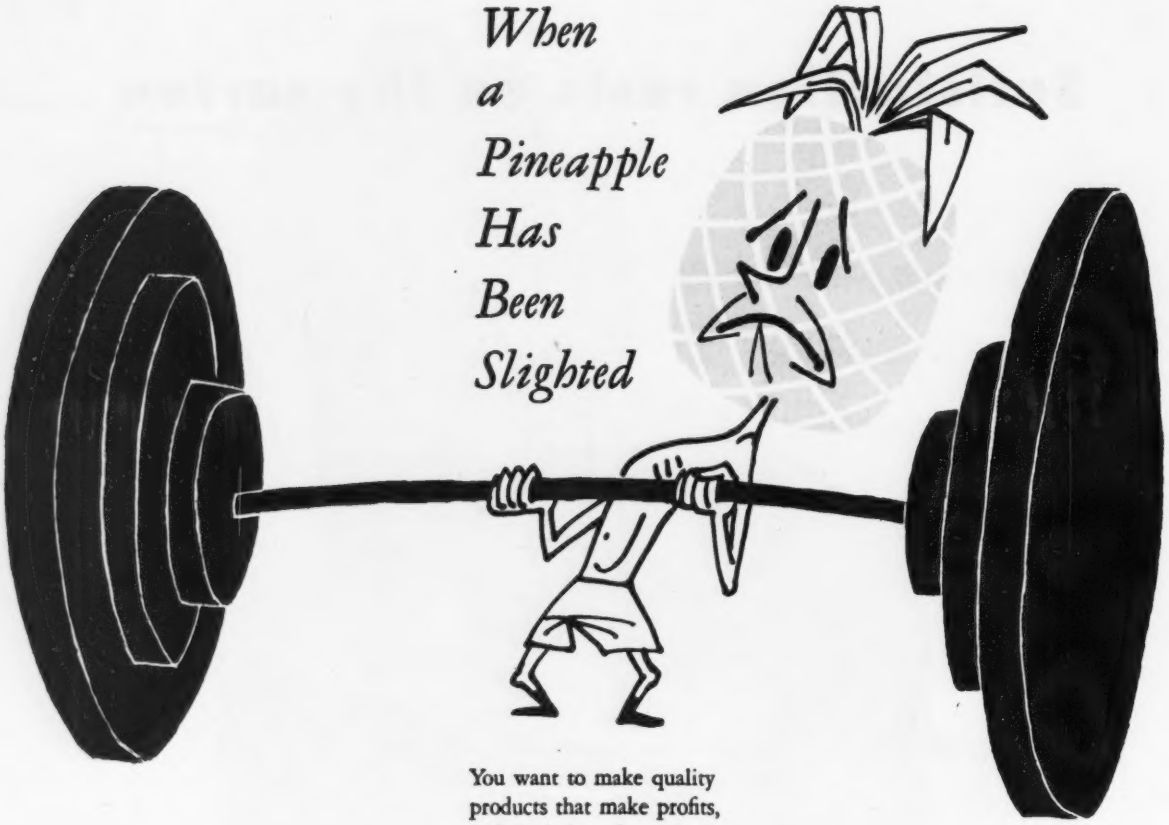
CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.



For more information, use coupon on last page.

*When a Pineapple Has Been Slighted*



You want to make quality products that make profits, and that's just about the whole story. Sometimes it's a difficult job.

There's a good way to do it.

Use Norda Flavors.

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*Use a Norda "Favorite to Flavor It"* **Norda**

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*These Particular Sharples Parallel Drive DH-2 SG Nozljectors are for the concentration of gluten.*

# ANOTHER BATTERY OF HIGH CAPACITY CONCENTRATORS!

**Up to 58% greater capacity with no increase in bowl size or speed ... and no increase in power consumption per unit of throughput. That is the big story of the Sharples PARALLEL DRIVE DH-2 SG Nozljector.**

***How is such outstanding performance possible?***

• A detailed study of the theory of sedimentation, coupled with extensive field tests by Sharples engineers, determined the proportions of the basic Nozljector bowl that would provide up to 58% increase in capacity . . . with long runs between bowl cleaning.

• To make full use of this new high capacity bowl, Sharples designed a rugged spur gear PARALLEL DRIVE capable of transmitting up to 50 H.P. input—a drive that will take heavy duty service with minimum wear and maintenance.

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What does this mean to you? No longer is input power the factor that limits throughput capacity for solids concentration or liquid phase separation. The Sharples PARALLEL DRIVE DH-2 Nozljector gives you both . . . efficient use of power input up to 50 H.P., plus over 50% greater capacity in the same size centrifuge.

***You can see the extra profits every operating day. We'll be glad to send you the facts... write for Sharples Bulletin 1276 today.***

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# The NEW Richardson VELOFEEDER

***means Better Bulk Feeding for the Food Process Industries***

The Richardson Velofeeder easily adjusts to deliver from a trickle to a torrent; ⅛ hp. motor moves 25 tons per hour.

**HERE'S WHY—**

**Higher Output**—from 300 to 50,000 lb. per hr. of hard granular materials, or 300 to 30,000 lb. per hour of soft ground materials.

**Lower Power Needs**—a ⅛ hp. motor powers entire unit—*as inexpensive as running a 100-watt light bulb!*

**Smaller Space Needs**—only 35 inches long, 17½ inches wide, 19 inches high. Standard vibrating tray 16 inches wide—stainless steel when required.

**Easier Control**—simple, quick adjustment, over wide operating range (from near 0 to 50 fpm. maximum).

**Safer Operation**—motor is explosion-proof (Class 2, Group G) where hazardous dust conditions exist. Complete dust enclosure on special application.

**Less Vibration**—although working frequency is 1850 vibrations per minute, little or no vibration is transmitted to any mounting installation (mounts with only 4 bolts!).

Now widely introduced for the first time, the new Richardson Velofeeder is a vibrating feeder offering *all* the advantages outlined. It is mechanical in operation, requiring negligible power to deliver a very high output rate, unequalled for total efficiency. Of more than 300 now in use, none has failed. Ideally suited to the feeding of sugar, grain, bran, tea, hard candies, cocoa, and similar materials, the Velofeeder offers a wide range of profitable application. Immediate delivery. For complete information on this new development, please write for Data Sheet 5302.

Richardson

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8433

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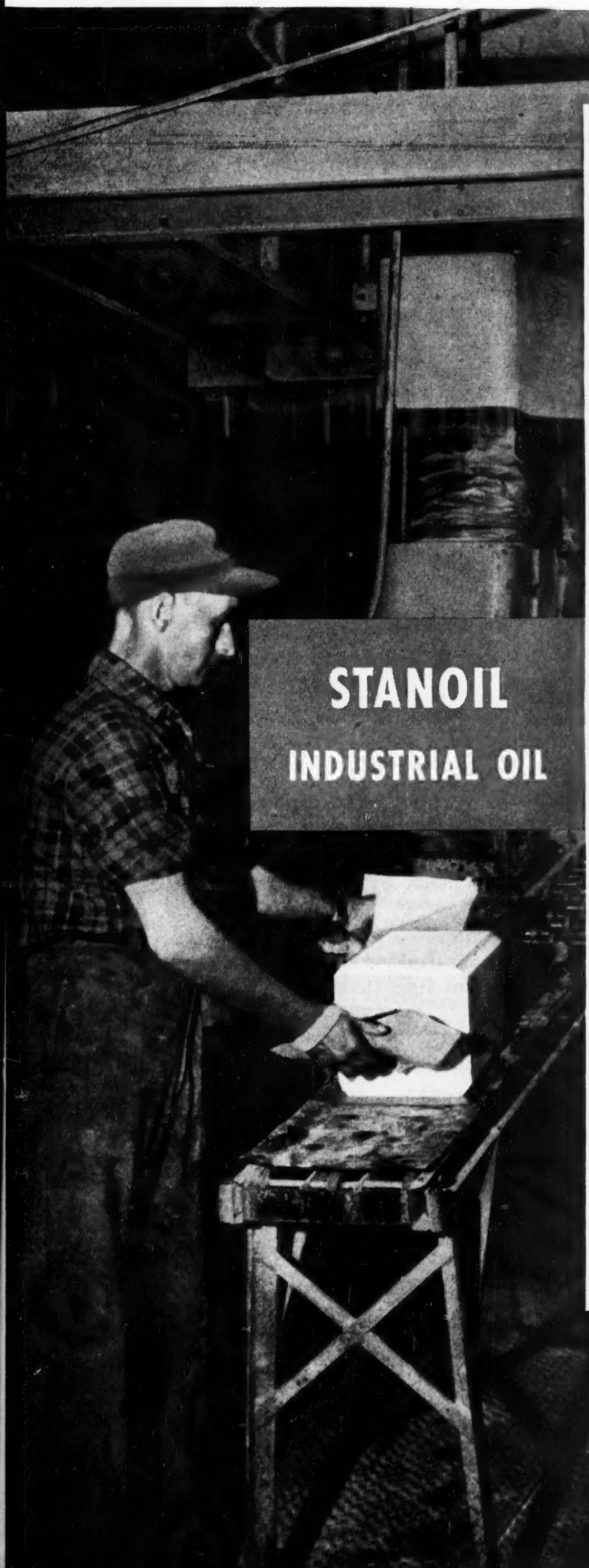

# How a good oil earns its salt!

Here's a "salty" story about an oil with staying power. When this 100 ton hydraulic press was to be installed by the Morton Salt Company in their Manistee, Michigan plant, officials outlined to a Standard Oil lubrication specialist some of the rigid specifications the required oil should have. The new press would operate under a heavy load five days a week, and since the original fill would be large — 22 barrels — it was important that the oil installed resist oxidation and remain in good condition for long periods.

The Standard man recommended STANOIL Industrial Oil #25, a many-purpose oil having high stability and effective rust protection. In over seven years of hard service, the oil has never been changed! During this period, periodic tests of oil samples have shown that STANOIL, despite hard service and high oil-operating temperatures, has maintained a lubricating quality comparable *with a new oil.*

For information on how *you* can best use STANOIL in *your* plant, check with a specially trained and experienced Standard Oil lubrication specialist. He can help you save time and money. Call your nearest Standard office, or write to Standard Oil, Chicago.

STANDARD

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*(Indiana)*

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**CONDITIONS:** Hot Rolled, Cold Drawn, Centerless Ground

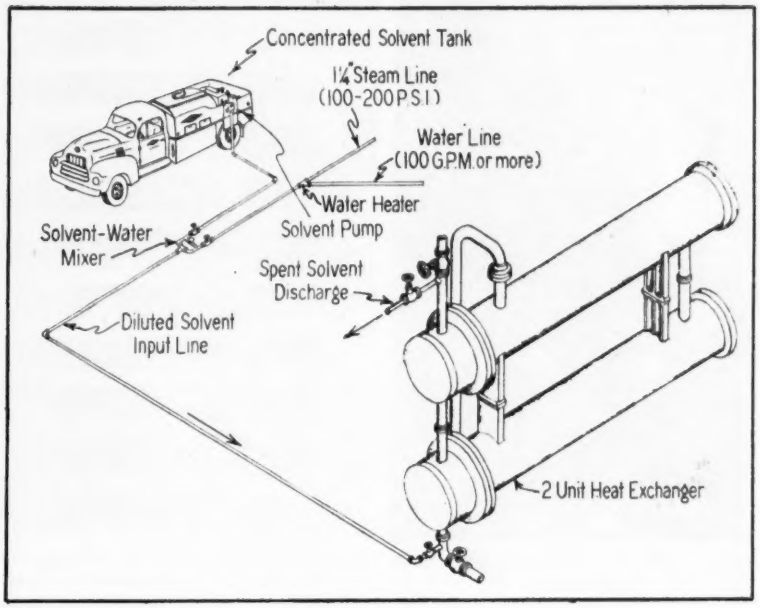
**FINISHES:** #1, #2B, #2D, #3, #4

# RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

**Here's Typical Hookup →**

**Concentrated acid from tank truck is diluted with hot water in proportioner, then pumped to heat exchanger. After predetermined soaking period, spent acid is drained, exchanger is hot-water flushed, followed by neutralizing solution. Gases are vented through spent-solvent discharge.**




New solvents and inhibitors, trim mobile units, better procedures now extend this method to jobs once requiring dismantling. Time cut to hours, maintenance promoted

# CHEMICAL CLEANING

## Proving Big Aid in Food Industry

**B. P. ROBINSON**
Dowell Incorporated, Tulsa, Okla.

First off chemical cleaning isn't new. It has been recognized as an effective maintenance tool for many years. But it was not until recently that its application was broadened to include practically every major industry, including food.

This expansion has been due largely to efforts of service companies in developing new chemical solvents, more efficient mobile pumping equipment, and improved cleaning procedures.

Through the concerted efforts of laboratory research chemists and experienced field engineers, the answers to many stubborn cleaning problems were finally found.

### What It Is

Chemical cleaning employs liquid solvents to remove all kinds of deposits from plant equipment—deposits that otherwise may reduce operating capacity, impede heat transfer and, in some cases, even result in contamination of products being processed.

Removal of these accumulations usually is accomplished by utilizing both the chemical and mechanical cleaning action of the solvents. The unwanted matter either is dissolved or disintegrated, following which it is readily flushed away.

Some idea of the scope of these cleaning methods may be gained from our accompanying table.

### Advantages of Chemical Cleaning

It is not to be implied that this method is the only one available. Many ingenious systems for manual or mechanical removal of deposits have been devised. Chemical cleaning does, however, possess a number of unique advantages. With it—

**1. Dismantling is held to a minimum.**

Solvents are pumped into the equipment through regular connections. They will travel wherever steam or water flow, reaching the most complicated surfaces—angles, curves, and inaccessible areas. As a result, cleaning procedure is greatly speeded up, requiring a matter of hours rather than days.

So designed are the solvents that they will attack the deposits and still not harm the metal of the equipment itself. They not only clean exposed surfaces, but also penetrate into pits or depressions, removing scale accumulations therein. Many times, chemical cleaning will reveal severe operational corrosion, unsuspected by the plant operator.

**2. Periodic-Maintenance cleaning programs may be set up.**

When plant equipment must be dismantled and cleaned manually, it is natural to postpone the job as long as possible, even though inefficient operation is costing many dollars daily. The case of chemical cleaning makes it practical to conduct such operations at regular intervals, and thus keep the unit at high-average performance at all times.

If equipment is operated too long and becomes badly fouled, the difficulty of cleaning is greatly increased. For example, in a heat-exchanger bundle, if tubes are allowed to become plugged, or spaces between them get packed solidly in places, it is impossible for the solvent to reach all of the deposit. In such cases, the operator has no alternative but to disman-

## X-Rays Reveal Structure of Deposits

FIG. 1 SCALE is placed in diffraction unit and photographed.

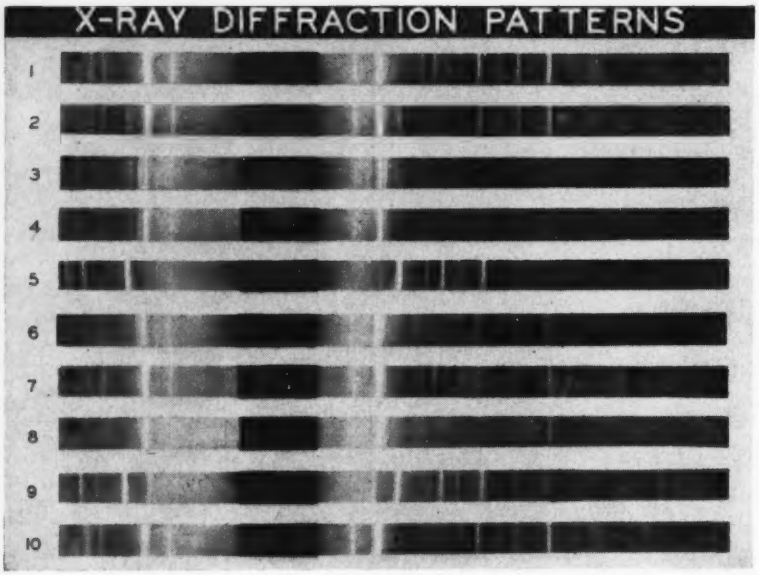



FIG. 2 PHOTOS indicate the chemical elements present in deposit, and also crystal structure of compounds in which they are bound.

tle the unit and remove the solidly packed deposit manually.

### What Does It Cost?

The question of cost is one that is difficult to pin down. Many factors enter in, and they may vary from one situation to another. Cost per unit depends upon the number of units that can be cleaned simultaneously by the same crew, and also on amount and type of deposit present.

Another factor is expense of preparing unit for cleaning. Here chemical cleaning offers a distinct advantage, by eliminating need for building scaffolds, disassembling equipment, and so on. Another important item for consideration is the saving of time, if downtime means the lowering of production schedules. In some cases, this factor alone will off-set the cost of the treatment.

### Planning a Treatment

Conducting a successful cleaning operation depends upon careful study of the problem involved and selection of the technique that will result in most rapid and thorough removal of the deposit.

This choice is made after consideration of the following factors: (1) Chemical composition and physical characteristics of deposit; (2) size, volume, and design of equipment to be cleaned; (3) materials of construction and precautions necessary to protect unit; (4) possibility of hazardous chemical reactions between solvent and deposit; and (5) use, when necessary, of chemicals that are non-toxic and will not impart an after-taste or odor to food products that are later processed in the equipment.

Deposits encountered in food plant equipment may be broadly classified as follows: Inorganic compounds; organic compounds, or mixtures of the two.

In the case of inorganic deposits, it is a relatively simple matter to conduct an analysis. A portion of the scale is finely powdered and an X-ray diffraction pattern recorded in special cameras, such as shown in Fig. 1.

Resulting analysis, not only indicates what elements are present but actually identifies crystal structure of the compounds they are bound up in (see Fig. 2). From this information, the cleaning engineer gains an advance indication of the relative ease or difficulty with which the deposit can be removed.

Once it has been identified, a series of solubility tests are conducted in the laboratory, subjecting additional pieces to action of various solvents. Here again, past experience usually indicates which types of solvents will be most effective.

As a result of these tests, the chemical solvent is chosen that will result in the most effective, yet economical, removal of that specific deposit. At the same time, definite recommendations can be made regarding treating conditions, time, temperature, concentration of solvent, agitation, etc.

When acid solvents are employed, it is essential to use an inhibitor that will provide adequate protection to any metal with which it may come in contact. These are chemicals that have the unique property of selectively preventing dissolving action of acid on metal without materially affecting reaction between acid and deposit. This is an electrochemical phenomenon, with the inhibitor plating out in a monomolecular layer over the surface of the metal. Under normal conditions, more than 99% protection is supplied.

Various metals used in manufacture of industrial equipment exhibit different degrees of resistance to inhibited acid. Accordingly, those pres-

### Food Equipment You Can Clean

**Beer pasteurizers**
**Blood plasma condensers**
**Boilers**
**Copper tubing in beverage plant**
**$CO_2$ absorber, reactivator**
**Dowtherm boilers**
**Filter beds**
**Fuel oil heaters**
**Heat exchangers**
**High pressure ammonia condensers**
**Liver extract condensers**
**Rice cookers**
**Rotary vacuum filters**
**Salt evaporator pans**
**Soybean extraction condensers**
**Vinegar coils**
**Water lines**
**Water wells**
**Steam heating coils in large open-type cookers (outside or process-side surface)**

ent in the unit to be cleaned will have a definite influence on selection of solvent, inhibitor, and treating conditions.

Generally speaking, a solvent temperature in the range of 150-175 deg. F. is maintained. If metals are present that possess greater susceptibility to acid attack, however, a lower temperature—usually with a 120 deg. F. maximum—is used. This reduces possible metal loss to a negligible amount.

### Hazardous Reactions

Some cleaning operations involve chemical reactions that require special safety precautions to see that gases so formed are properly vented. Hydrogen, when evolved, usually can be liberated to the atmosphere, provided there is no danger of explosion. Hydrogen sulfide, formed when an acid-soluble sulfide such as iron sulfide is dissolved, can be disposed of easily and safely by directing it into a caustic scrubber. Chlorine and sulfur dioxide also can be disposed of in this manner.

Specialized equipment facilitates application of solvents. The mobile pumping unit generally contains chemical tanks for transporting solvent to job location, as well as centrifugal pumps for transferring it to equipment being cleaned. Different design units are employed for special applications requiring large gallonages, or special heavy-duty pumps for use when solvents are to be applied under high pressures.

### Cleaning Procedures

Actual mechanics are relatively simple. Once deposit sample has been analyzed and treating recommendations made, solvents are transported to the plant, and pump truck is hooked up to equipment.

A typical hook-up is shown at the beginning of this article. The service company's mobile pump truck is connected to a dual heat exchanger. This truck is equipped with a 1,000-gal. chemical tank and a centrifugal pump. Concentrated acid solvent is pumped through a proportioning mixer, where it is diluted to desired concentration with heated water. Heat exchangers are filled with the dilute acid solution, containing a wetting agent to facilitate penetration into an oily deposit.

Solvent generally is allowed to soak about 5 or 6 hr., although sometimes it is circulated back through the pump truck and into the exchanger again. Frequent checks are made to assure that cleaning operation is proceeding efficiently, and that solvent is not becoming spent or corrosive.

Gases are vented out the spent-solvent discharge valve on top of exchangers. A hose can be attached if necessary. When unit is finally clean, solvent is flushed out with water, followed by a neutralizing solution, if required. Unit is then ready for inspection.

### Case Histories

Now let us cite a number of actual case histories of cleaning operations conducted in various food plants throughout the country, not only from the standpoint of the cleaning techniques used, but also the results.

**1. Piping system in beverage:** In fabricating the new ½ and 2 in. copper tubing, all joints were made by sweating. Coppersmiths had permitted soldering paste, composed essentially of powdered rosin intimately mixed with a solid mineral oil similar to Vaseline to fall into the line. Cleaning procedure consisted of circulating a hot (175 deg. F.) dilute alkaline solution, containing a wetting agent, through the lines for 3½ hr. at a rate of about 10 gpm. Lines were then rinsed with hot water and found to be clean.

**2. Cooling sections of vinegar generators:** This equipment consisted of a 1 in. stainless steel vinegar line within a 1¼ in. copper line that coiled around a 10-ft.-dia. wooden vinegar generator. Surfaces of annular space between tubes had become coated with copper-oxide deposit that impeded transfer of heat from vinegar to cooling water and reduced capacity of operation. Twenty-eight units were cleaned, one at a time.

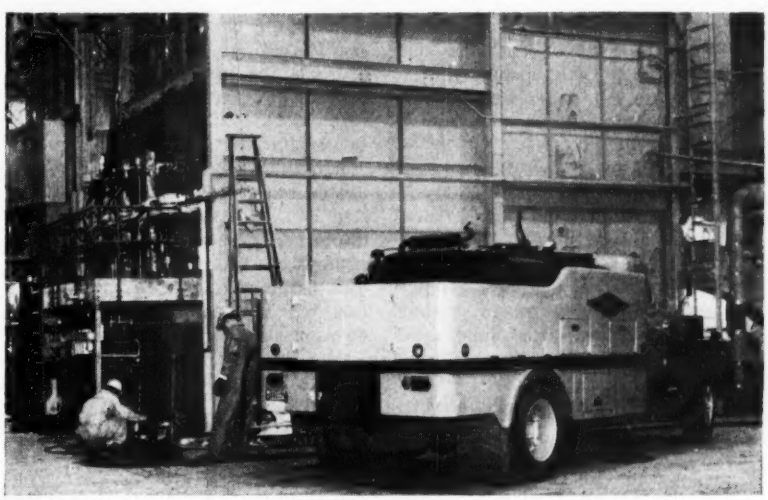
Vinegar was drained from line and inhibited acid was circulated for 20-30 min., then flushed from system with water. Final rinse with soda ash flushed the remaining loose sludge from the system. Cleaning time was 30-40 min. per unit. Inspection showed complete removal of scale. Water consumption was considerably less than before cleaning and the plant was able to operate at full capacity.

**3. Fuel oil heaters at sugar mill:** Two units had developed considerable gunk on the oil side. This impeded heat transfer and increased pressure drop. Hot hydrocarbon solvent was circulated through the heaters for 1 hr. A hot dilute alkaline solution containing an emulsifier and a wetting agent then was circulated for 3 hr. Alkaline solution then was displaced by air pressure. Results were extremely good. Pressure drop was reduced from 60 to 30 psi. A 40-deg.-F. temperature increase was made possible.

**4. Large open-type cookers in citrus plant:** Process sides of steam coils in four large open-type cookers were cleaned with inhibited acid. This resulted in a saving of $4,859 in cost of producing canned grapefruit sections. Most of saving resulted from shorter warm-up time and a more even temperature in the tanks.

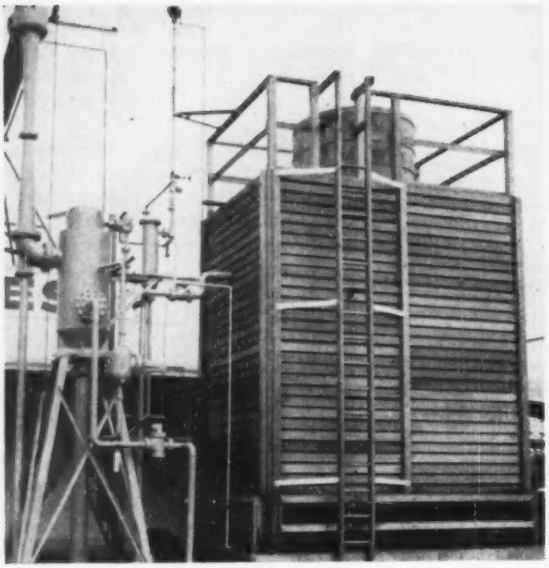
**5. Liver extract condenser:** Product side of liver extract condenser was cleaned to remove dried liver residue. Deposit varied in thickness to a maximum of ⅛ in. Treatment employed alkaline-oxidizing solution circulated for 3 hr. at 180 deg. F., followed by a 6 hr. inhibited-acid stage at atmospheric temperature. Undissolved, loose, disintegrated residue was flushed from condenser by dilute alkaline solution. Tubes were found to be clean down to metal.

(*Turn to page 166*)

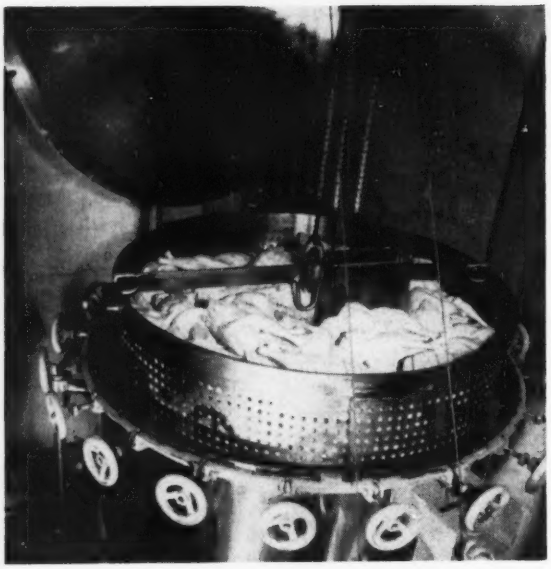


**MOBILE UNIT**

**It contains tanks for transporting chemicals to job, and centrifugal pumps for transferring solvent to equipment to be cleaned.**



Evactor assembly . . .



. . . cools cooked fowl in 20 min.

# HI-VAC UPS OUTPUT

## And Boosts Protection of Food Quality

### Poultry-Pie Capacity Rockets 1,000%

—when rapid evaporative chilling techniques are applied. . . Turn out more in an hour than used to be made in a day. . . Spoilage potential minimized

**C. GORDON BEISEL**
FE Correspondent, Ontario, Calif.

There already are two well-merited feathers in the cap of Ed Clark—one for his notable development of frozen poultry pies, the other for his contriving of special flexible aluminum pie pans to carry them.

These advances token the high technological progress of his enterprising company—Clark's Ranch Kitchen, of Temple City, Calif.

**▶And now there has been added an outstanding third feather—an engineering stride that improves product quality and at the same time raises rated plant production capacity more than 1,000%.**

**In one giant step this new achievement has hurdled two processing bottlenecks—**

**1. By adaption of high-vac techniques, processed fowl are rapidly chilled following cooking.**

**2. The formulation of tasty gravies is closely controlled, resulting in maximum retention of nutritionally significant factors.**

As is the case of many other advances, all this has been done by utilizing the experience and similar equipment found in processing other frozen foods—i.e., concentrated orange and other citrus juices.

This addition to the conventional process incorporates the use of a multistage steam-jet evactor system that produces low operating pressures at strategic unit operations. The evactor unit, made by E. J. Kelly & Associates, Los Angeles, was chosen for its economy of installation and operation.

Historically, the frozen poultry pie business began its significant growth during the war years, when fowl was the major substitute for red meat. The Clark family were among the first turkey growers in the Southern California area to install quick freezing equipment at their ranch, making it possible to kill, draw, and store frozen turkeys to meet market demands. This same freezing equipment was used in their development of the high quality frozen turkey pie.

Originally, the pies were packed in cellophane envelopes, heat sealed to prevent dehydration. But this method of packaging did not provide sufficient protection against breakage of this rather fragile product during distribution (handling, stacking, and displaying).

In addition, the pie subsequently had to be transferred by the consumer to a suitable container for baking the crust and, simultaneously, heating the pie. This meant that cooking times were dependent on heat-transfer performance of random containers chosen by the consumer—ranging from a conventional fruit pie tin to a Pyrex dish.

All these problems were surmounted with the company's development of a special fluted aluminum-foil pan. Clark's calls it the "Magic-Flexi Dish." Packed in this pan, the product then goes in a square cardboard box. The latter can be safely stacked and handled during shipment, distribution, and in retailers' frozen-food cabinets.

In addition, and of equal importance, the consumer now has the advantage of rapid heat transfer during cooking and maximum simplicity in removal of the baked product from the container.

After this development it was not long before market demand for the pies exceeded the current production potential. At this time, output was slowed by low-volume, custom handling techniques. In the program to boost it, two factors became evident:

**1. The process of chilling cooked fowl should be designed to eliminate the spoilage hazard during the lengthy cooling cycle.**

**2. The production of gravy should be geared to high-speed semi-continuous methods that would preclude flavor changes from oxidative or microbiological causes.**

Heretofore, cooked fowl conventionally has been chilled by transferring the load from the kettle into a sharp freezer room. Time for cooling 1,000 lb. of chickens down to 60 deg. F. ordinarily was 12 hr.

### Cools Fowl in 20 Min.

**But with the new high-vac method (29-plus inches of mercury), chilling takes less than 20 min. And by reducing the cooling times of both cooked fowl and gravy, rated production capacity of this plant has been increased from 5,000 pies a day to 7,000 pies an hour.**

This degree of vacuum is an innovation in the cooling of solid foods. Applications to other solid food seldom has exceeded 26 in. There has been cited the factor of equipment and fuel costs required to reach the high range.

However, it is pointed out that new techniques, such as in this installation, permit attainment of low operating pressures at high evacuation rates and at low cost.

The advantage of lower operating pressures is evident in our accompanying chart. The temperature of water vapor at 26 in. vacuum is 125 deg. F. Reduction of the absolute pressure to 0.4 in. results in a vapor-temperature drop to 65 F. This wider temperature differential, coupled with the high velocity of heat transfer inherent in vacuum cooling, makes possible the chilling of solid food at rates unattainable by static means.

Heat transfer is enhanced by introducing water into the cooking kettle after fat and broth have been removed. Water level is maintained below the basket containing the fowl. As vacuum is applied, evaporative cooling occurs, and the sensible heat in the fowl is rapidly transferred to the water vapor. This technique also eliminates dehydration during cooling.

The rapid drop in product temperature is essential to eliminate any spoilage potential. Bacteria can thrive in the optimum incubation temperature afforded by slow cooling. On the other hand, if steps are taken to strip the meat from the bird while it is still hot, boning is inefficient and the "wholeness" of the pieces suffers.

This method of rapid cooling also serves to rupture the ligature, thus permitting rapid deboning of whole pieces, and so adding to the appetizing appeal of the finished product.

The second application of high vacuum is in the production of gravy, where rapid handling from formulation to chilled product is essential for full flavor retention. After cooking of the fowl, the broth and fat are combined with flour and seasoning to make the gravy in a vacuum equipped kettle of special design.

**FOR FLOWSHEET of Clark's advanced frozen poultry pie line, see pages 114-117.**

Gravy stock is cooled in two stages. This two-stage method is made possible by engineering the vacuum system to utilize the components in a sequence that permits maintenance of an optimum temperature gradient.

Heart of this new processing technique is the vacuum "utility". The term "utility" is used to emphasize the result of planned engineering, wherein vacuum is available as a service to a unit operation in the same efficient, flexible manner as other utilities—gas, water, electricity.

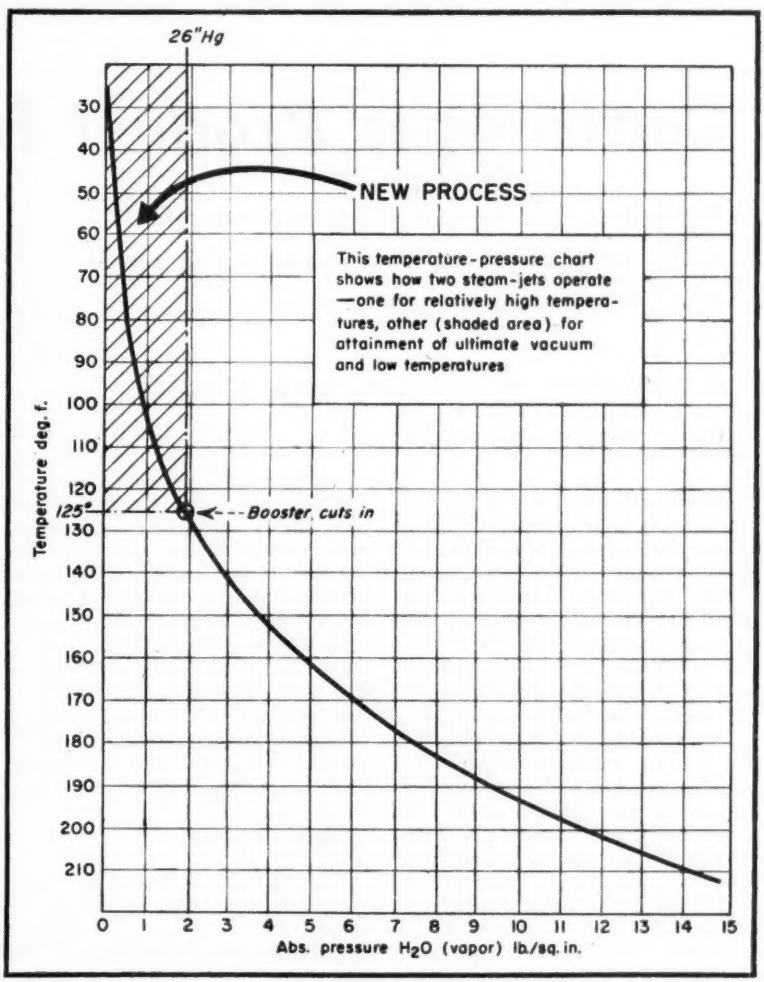
### Has Two Components

This installation has the ability to attain absolute pressures heretofore not economically feasible. The multi-stage steam-jet system has been broken down into two operating components—one for relatively high temperature work, the other for attainment of ultimate vacuum and low temperature. This dual arrangement has the economic advantage of accomplishing the high temperature work without consuming the additional steam required to energize the booster.

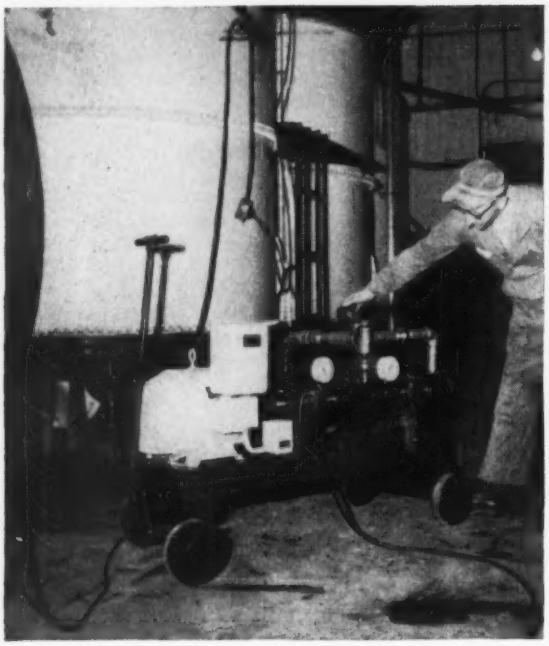
The primary jet system requires 115 lb. of steam per hour to operate, with the booster consuming 180 lb. per hour.

The jet system can be used with 85

(*Turn to page* 189)

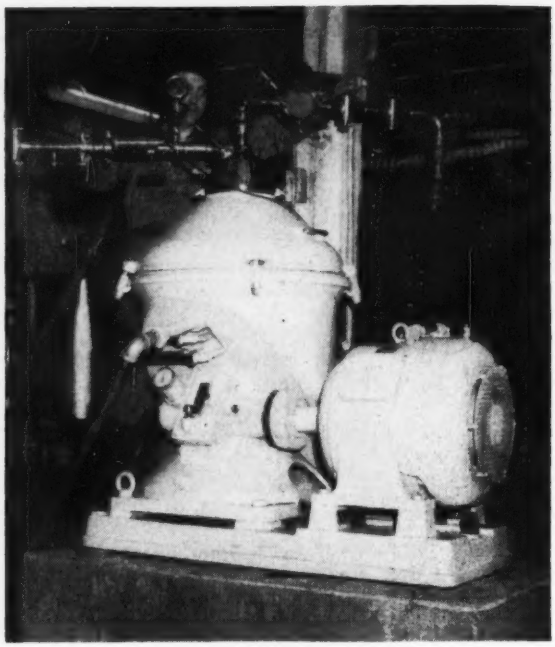


Lees are pumped . . .



Positive-displacement unit has sanitary contact parts.

. . . to centrifugal . . .



High-speed machine fits compactly in production line.

# Centrifuges *Product* From *Waste*

**Self-cleaning, high-speed unit not only salvages quality wine but also performs polishing job. Low cost is feature of continuous operation**

**WM. E. DOHERTY, JR., T. E. CARL and R. G. NOYES**

Respectively, Vice-President in Charge of Production, Chief Chemist, and Chemist, Pleasant Valley Wine Co., Rheims, Hammondsport, N. Y.

Recovery of wine formerly lost with the lees has proved commercially feasible at the Pleasant Valley Wine Co., producer of Great Western champagnes and wines, Rheims, Hammondsport, N. Y. A continuous, self-cleaning centrifugal does the trick.

What's more, the unit polishes, with high-brilliance clarification at gallonage production.

We here in the control laboratory had felt for years that centrifuging of wines was basically sound for such separating. Our premise further was strengthened by the established success of centrifugals in hundreds of different industries, particularly in postwar years. Surely one of the many types could be adapted to do our job.

Keenly interested in advancing engineering progress in the field, President R. H. Howell and his management already had backed us with capital in an earlier centrifugal trial. This venture unfortunately proved unsuccessful and relatively costly. But still believing in the principle, we then persuaded the top echelon to let us try again, got our present machine, and prepared for the new test.

If successful, the investment quickly would pay for itself not only in terms of recovery but in quality protection.

## Common Difficulty

This problem of recovering usable wine from the heavy sediments collected at the bottom of tanks following fermentation, blending, and fining operations is not exclusive to our plant. It's found in the whole field.

These sediments comprise from 2 to 5% volume of the container. They consist mainly of dead yeast cells, grape pulp, various filter aids used in pressing grape pectin precipitated during fermentation, cream of tartar crystals deposited during alcohol build-up and chill-proofing of the wine, and fining agents thrown down during clarification.

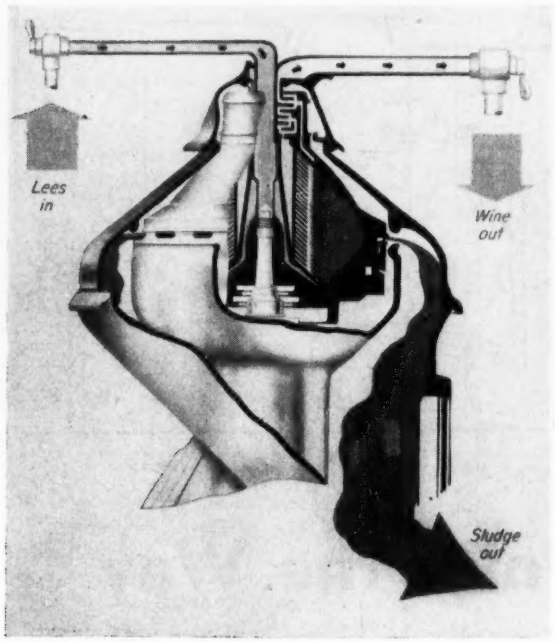
## Valuable Wine Remains

Yet contained therein are from 25 to 50% by volume of liquid (the percentage varying with the chief component of the sediment), even after the wine in the container has been allowed to settle and the liquid decanted off the top as close to the solids as possible.

Obviously this wine has commercial value and should be saved. In wineries that don't distill off their lees, these wine-laden sediments are discarded as waste. Bu two methods—decanting (racking) and filtering have been employed as standard cellar practices in attempts to salvage such wine. Even so, neither means has proved entirely satisfactory.

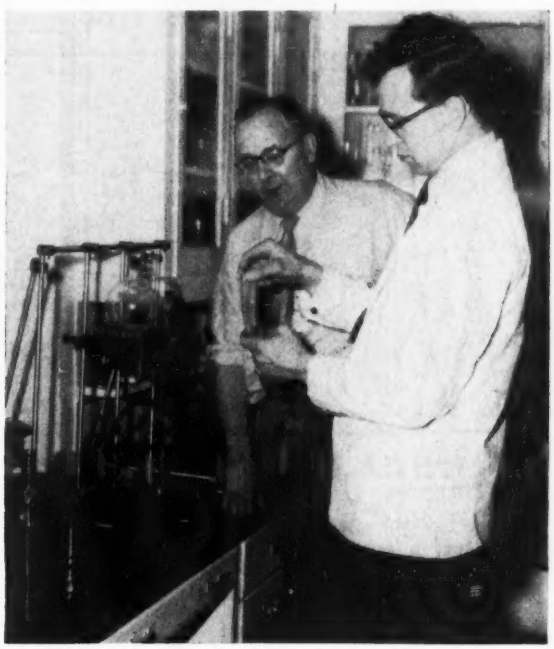
In decanting, wine is allowed to

. . . where wine is recovered . . .




Solids accumulate in bowl, are discharged non-stop.

. . . that assays at top quality



Samples are checked by Co-Authors Carl (left) and Noyes.

settle in large tanks over a long period of time, preferably at low temperatures. Solids collect at the bottom of the container in a compact mass. Due to lowered temperature, a thin layer of cream of tartar is precipitated at the top of the sediment. This tartar layer acts as hold-down for easily stirred-up lees beneath. Wine is drawn off down to this layer.

Here, four disadvantages are cited:

1. Valuable cooperage is tied up for long periods.

2. When wine is allowed to remain on lees for any length of time, there is danger that unwanted flavors will be absorbed from the lees.

3. The operation necessarily extends long after fermentation, hence does not supply wine to meet demands shortly after vintage time.

4. In some areas, temperatures do not remain at low levels long enough to precipitate all possible tartrates and thus form the layer over the lees.

Filtration, the other method, also has limitations due to pressure build-up, the need for using large quantities of filter aid, frequent changing of sheets, and low throughput as heavier lees or solids are encountered.

## Past Objections Cited

In truth, centrifuging, too, has been beset by a number of obstacles:

1. Difficulty of cleaning solids from machines without stopping.

2. Loss of valuable wine during the cleaning process.

3. Tendency of machines to clog when too many, or too large, particles are encountered.

4. Tedious cleaning of the machine after each operation, usually involving costly, time-consuming disassembly of the unit.

Because of its self-cleaning or self-desludging feature, the Titan centrifugal offered the answer. This unit, marketed by Pitmar Centrifugal Machine Corp., Baltimore, Md., is a special Danish development. In the first place, its self-desludging would climinate need for periodic, messy, and costly bowl cleaning. Moreover, production would run non-stop and labor and maintenance costs would be substantially reduced. The desludging—consisting of opening of bowl, discharging sediment, and closing of bowl is accomplished either manually or automatically in less than 10 sec. No tools are needed.

## How It Works

In operation, the machine accumulates solids in the bowl. These can be discharged while the bowl is rotating at full speed. Operation of the desludging device is very simple. A series of large peripherally placed slots are located in the centrifugal bowl, suitable for discharge of fairly large solid particles.

These slots are held closed by a cylindrical ring valve. During full-speed operation, and without any mechanical connection between the turning bowl and te mechanical hydrostatic control means, a small amount of water at normal waterline pressure is directed into a peripheral groove under the ring valve. The centrifugal

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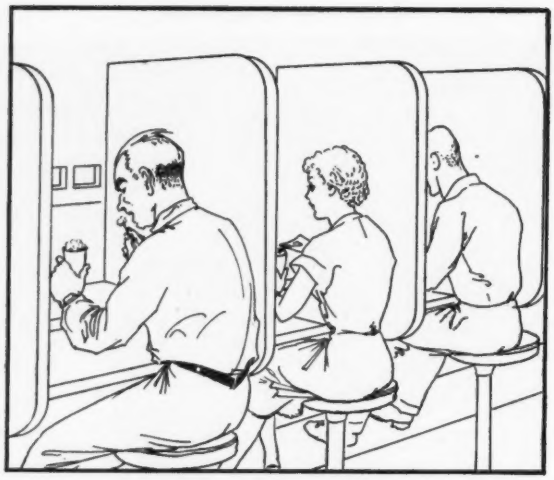
**LABORATORY CHECKS** Made During Test 2 Show Percentages of Solids, Liquid, Alcohol

| | Solids | Liquid | Alcohol |
|---|---|---|---|
| 1. Wine before centrifuging | 50 | 50 | 11.5 |
| 2. Wine after centrifuging | 1.67 | 98.33 | 11.5 |
| 3. Sludge from wet discharge | 34 | 66 | 8.1 |
| 4. Sludge from dry discharge, 1 | 80 | 20 | 9.2 |
| 5. Sludge from dry discharge, 2 | 75 | 25 | 8.4 |

Note: In a wet discharge, desludging time is longer and a small quantity of water is often added to sludge during operation. Alcohol percentage of sludge always ran below that of wine proper. This indicates that only small quantity of wine contained in sludge is lost, not usable wine itself. Further test showed that alcohol content of lees sediment in bottom of cask is same as that of wine.



**PHYSICAL PROPERTIES? . . . OR . . . HUMAN REACTIONS?**

# Which Really Point the Way In Tests of a Product?

Checks on bags of popcorn demonstrate that observer-panel psychometrics can give a most telling gage of performance —with an extra benefit on the score of consumer acceptance

**NOEL SCHWARTZ**
United States Testing Co., Inc., Hoboken, N. J.

By emphasizing the human reactions to food products—rather the properties of the product itself—the psychologist often obtains information that is more reliable than that from other types of research (FE, May, p. 57).

▶ **From an analysis of the physical and psychometric data, it is possible to conclude that consumer judgments generally are more sensitive than are physical tests. Further, they are more meaningful in that final acceptance of any product is dependent on these consumer ratings, rather than on results of arbitrary physical tests.**

As a concrete illustration, let us consider recent tests made to determine the relative effectiveness of six types of packaging materials for popcorn bags.

These measurements consisted of psychometric flavor-tests and physicochemical analyses, designed to establish relative effectiveness and pattern of popcorn deterioration in a typical amusement park.

Before tests were conducted on the popcorn it was deemed necessary to select packaging materials that were representative of their particular type. Therefore, checks were made on: (1) Water vapor permeability, (2) basis weight, and (3) coating determinations.

Once representative materials had been selected, the stage was set for the main test program.

Exposure trials were divided into two categories of packages: Those to be exposed to ultraviolet radiation, and those subjected to 90 deg. F. and 85% relative humidity.

For the latter, a conditioning room was prepared in which bags were suspended to allow maximum air flow over their entire surface. Temperature was maintained at 90 deg. ± 3, while humidity level was at 85% ± 5%.

For ultraviolet exposure, GE "RS" type sun lamps were installed 4 ft. above packaged product, at a bulb-to-bulb distance of 40 in. Width of exposure area did not exceed 30 in. According to GE specifications this type bulb, at a distance of 4 ft., will project light in an area of 40 in. dia. and corresponding to noon sunlight in this latitude. This test was conducted in a conditioning room maintained at 72 deg. F. and 45% relative humidity. In a preliminary test it was established that the sunlamps did not affect temperature of packages at specified distance.

Popcorn (35 lb.) was obtained from a local manufacturer. Product was uniform in regard to cooking time, temperature, and oil content. All off-color, broken, or oil-soaked particles were rejected. Popcorn was sealed in tin cans with friction tops and delivered to the United States Testing Co. for packaging within 2 hr. after production.

Bags were filled in kitchen of psychometric laboratory at a temperature of 72 deg. F. and relative humidity of 37%. Each contained 1.25 oz. of popcorn. Bags I, II, and III were heat-sealed, while IV, V, and VI were stapled. Temperature of heat-sealing unit was 350 deg. F., and time of sealing was adjusted to 1 sec. After filling and sealing, bags were stored over night in the psychometric kitchen

before the test program was launched.

The following physical and psychometric studies were conducted simultaneously:

**A. Physical Tests:**

1. *Moisture content* of popcorn before exposure.

2. *Oil content* and *peroxide tests* before exposure.

3. *Temperature and humidity exposure.* Samples were tested at end of 2nd, 4th, 7th, 9th and 11th day for weight gain. At end of 11th day, moisture content and peroxide tests for rancidity were run on samples from each bag.

4. *Ultraviolet light exposure:* Popcorn in each type bag was exposed for 11 days, and peroxide tested at the end of the 2nd, 4th, 7th, 9th and 11th day for rancidity.

**B. Psychometric Flavor Tests:**

1. *Absolute ratings on a Hedonic Scale.* Popcorn as received was rated by a panel of 40 consumers on a nine-point absolute rating scale (see accompanying panel). The sample achieved a mean rating of 7.9, which is in the "like moderately" category. This method made available a reference point—when the popcorn was freshest and would be expected to achieve its highest consumer acceptance.

2. *Difference Tests.* Portion of original sample was retained in sealed cans and used as a standard from which degrees of degradation of exposed product could be determined. Method employed was as follows:

Observers, selected for their sensitivity and ability to detect small odor and flavor differences, were presented with three samples—One, Two, and a Standard identical with one of the others.

Confronting these observers was the problem of determining, by testing, which of the two samples is different from the standard. Thus, in testing Bag 1, the problem for the observers stacks up as follows:

**First Half**

| Sample One (Control) | Sample Two ("I") | Standard ("I") |
|---|---|---|

**Second Half**

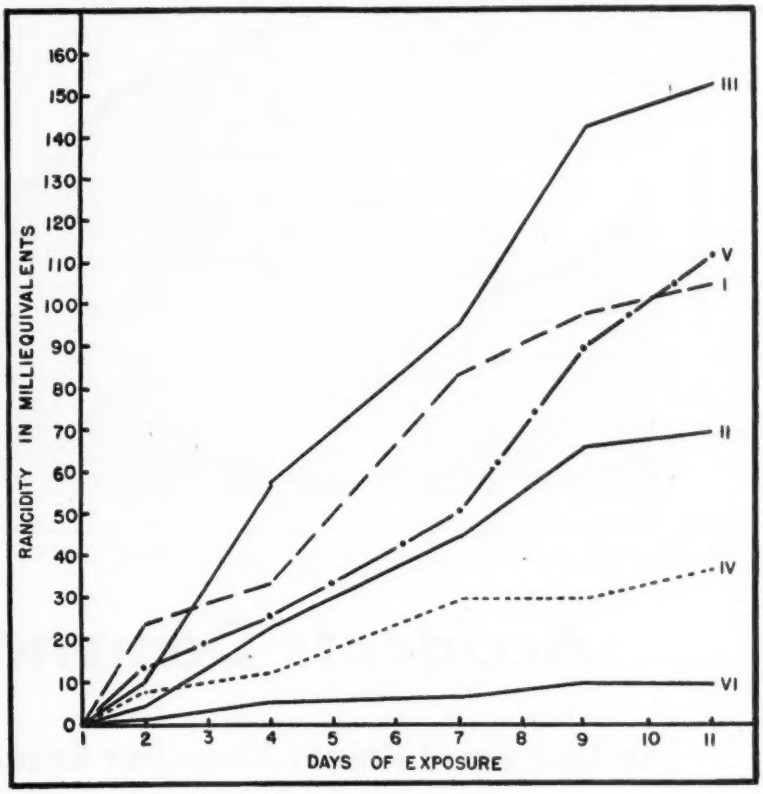
| Sample One (Control) | Sample Two ("I") | Standard (Control) |
|---|---|---|

In the first half of the test, Sample One is different, and in the second half, Sample Two is different. Note that the entire pattern of presentation has been changed in order to eliminate any chance errors due to non-random order of presentation.

This method, then, yields a numeri-

(Turn to page 162)

## How U-V Rays Influence Rancidity




## Ultraviolet Exposure

| Sample No. | Day: Second | Fourth | Seventh | Ninth | Eleventh |
|---|---|---|---|---|---|
| I | C.R.* 0.9 | C.R. 1.3 | C.R. 3.6 / Abs. 1.7 | ** | ..... |
| II | C.R. 0.0 | C.R. 1.0 | C.R. 0.8 | C.R. 2.0 / Abs. 5.2 | Abs. 3.0 |
| III | C.R. 2.8 / Abs. 4.9 | Abs. 2.4 | ..... | ..... | ..... |
| IV | C.R. 1.5 | C.R. 0.7 | C.R. 1.6 | C.R. 1.8 | C.R. 3.1 / Abs. 1.9 |
| V | C.R. 0.4 | C.R. 0.0 | C.R. 1.0 | C.R. 2.9 / Abs. 4.1 | Abs. 2.0 |
| VI | C.R. 0.0 | C.R. 0.9 | C.R. 1.2 | C.R. 1.6 | C.R. 1.7 |

* C.R. means critical ratio.

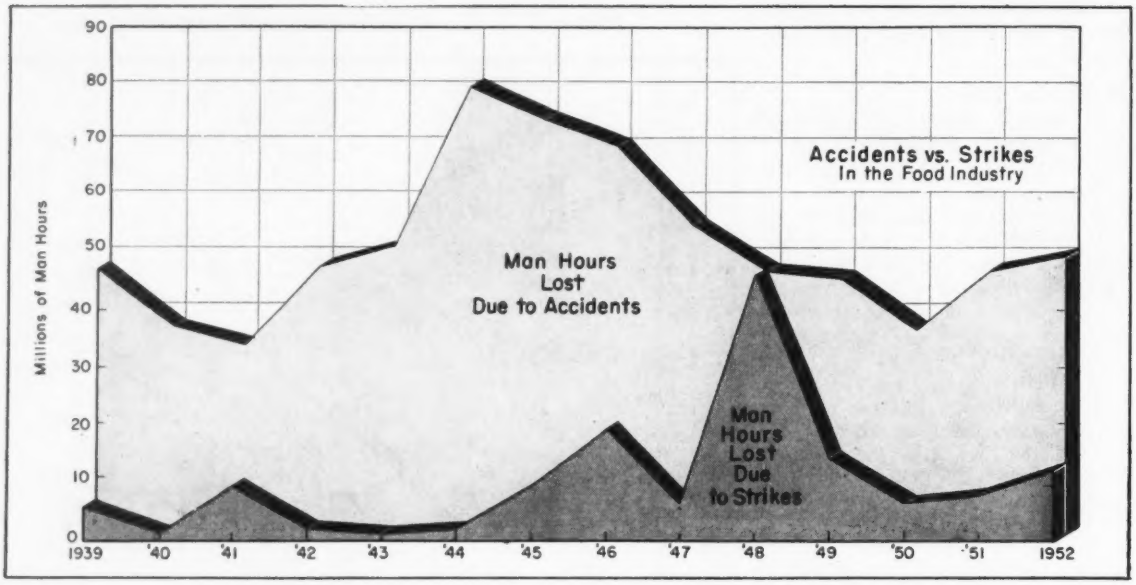
** Where absolute ratings (Abs.) fell at extreme low end of scale, it was considered advisable to discontinue testing these samples since they had objectionable flavor and odor.

## Temperature and Humidity Exposure

| Sample No. | Day: Second | Fourth | Seventh | Ninth | Eleventh |
|---|---|---|---|---|---|
| I | C.R. 0.0 | C.R. 1.0 | C.R. 1.95 / Abs. 5.9 | ..... | ..... |
| II | C.R. 0.9 | C.R. 1.2 | C.R. 0.0 | C.R. 1.8 | C.R. 2.3 / Abs. 4.9 |
| III | C.R. 0.5 | C.R. 0.9 | C.R. 1.5 | C.R. 1.3 | C.R. 1.7 |
| IV | C.R. 1.1 | C.R. 0.3 | C.R. 1.7 | C.R. 2.7 / Abs. 4.9 | Abs. 2.0 |
| V | C.R. 0.8 | C.R. 0.0 | C.R. 0.7 | C.R. 1.3 | C.R. 1.5 |
| VI | C.R. 1.3 | C.R. 1.6 | C.R. 2.0 / Abs. 5.0 | Abs. 3.2 | ..... |

## Testers 9-Point Absolute Scale

| | |
|---|---|
| 9 ..... Like extremely | 4 ..... Dislike slightly |
| 8 ..... Like very much | 3 ..... Dislike moderately |
| 7 ..... Like moderately | 2 ..... Dislike very much |
| 6 ..... Like slightly | 1 ..... Dislike extremely |
| 5 ..... Neither like nor dislike | |




**WE LOSE** 5 man-hours to accidents for every 1 due to strikes.. Only fleetingly ('48) did strike loss come abreast.

# *Accidents* Demand *Action*

## In Our Food Plants They Far Exceed Strike Losses

Poor safety record bluntly spotlights food industry as hazardous—even dangerous . . . But—there's plenty of proof that a good, fighting plant program can lop the peaks off high-soaring insurance premiums

**IVAN C. MILLER,** Associate Editor, "Food Engineering"

Our accident record in the food industry long has been, and still is, disgraceful and very costly.

**It is much safer to work in an explosive manufacturing plant than in most food plants.**

Most of the time during the last 14 years, our industry's accident severity rate has been shockingly above that for all-manufacturing. This is revealed by the Bureau of Labor Statistics, which has specific records for these years.

As recorded by the Bureau, the accident *frequency* rate of our industry may appear less significant than the *severity* rate. However, frequency is based only on those accidents that are disabling and, therefore, result in lost time by the injured.

Food's accident frequency is also alarmingly above the all-manufacturing rate.

For any of the last 14 years the food industry has been more hazardous to work in than most. Only three manufacturing groups were more dangerous in 1950—(1) the lumber industry, (2) stone, clay, and glass, and (3) fabricated metals.

All during these BLS-recorded years, and unquestionably during many previous years, accidents cost our industry more man-days than were dissipated due to strikes —four times as many in 1952 and more than 50 times as many in 1943—with an average for the period since 1939 of approximately 5 to 1.

### Insurance Cost High

In most of our states the accident record of each industry during the immediate prior years establishes the employee-insurance base-rate of the industry for the next year.

The current base-rate for canneries in Florida is $2.28 per each $100 of payroll. In New York State, base-rate for meat products industry is $3.70, and for breweries $5.10 per $100 of payroll.

If, for several years, the accident record of a company is kept well below the average of its industry in the state, then insurance premiums are lowered. On the other hand, when a company's injury record is above industry average, additional insurance premiums above base are required.

The difference in premiums paid by two local companies can place one at a considerable competitive disadvantage.

Here's an example of two large competitive breweries located in the same state. Brewery A pays $5.039 per $100 of payroll. However, brewery B has so minimized accidents that it only has to pay $3.315. What this means

can be appreciated by the fact that Brewery A actually would save some $172,000 per year in premiums if it were able to "safety" its operations so as to be eligible for its competitor's rate.

By reducing its injuries, a food plant can earn refunds and lower its future premium rate. This will contribute toward bringing down the whole industry's base rate, thus benefitting all.

### Costs Higher Than Shown

In order to determine the accident position of the food field relative to all-manufacturing, the tabulation only covered the time that was lost by the injured as the result of accidents. Accordingly, there should be added to the BLS-record from 50 to 100% more lost days—these to account for the final results of "fatal and crippling injuries."

Consider the comment by BLS in its 1943 report *Work Injuries in the U. S.* "if allowances are made for future economic losses caused by death, permanent total disabilities, and permanent partial impairment, the total time lost reaches," more than four-fold the reported time lost.

None of the foregoing considerations takes account of time lost by other employees or of production losses. Every responsible employee knows that even minor accidents, which may cause only negligible loss of time by the injured worker, nevertheless interrupt production and reduce plant output.

According to the National Safety Council in its 1953 edition of *Accident Facts*, man-days lost by workers totalled 45,000,000. This time lost by injured employees includes primarily the actual time lost during a year from disabled injuries, not counting however, time lost on the day of the injury or time required for further medical treatment or checkup following the injured person's return to work.

Fatalities are included by NSC, figured as an average loss for the year 1952 of 150 days per case. And permanent impairments are encompassed in terms of actual days lost, plus a small allowance for lowered efficiency resulting from the impairment. These latter injuries actually are seen causing about 140,000,000 more lost days in each future year.

Time lost by others than the injured in 1953 was calculated as 205,000,000 man-days. This lost time occurred when neighbor employees stopped work to aid the injured or to discuss the accident. Covered here were slowdowns resulting from temporary reductions in efficiency of persons witnessing serious accidents, suspensions of work caused by damaged equipment, and the time required to replace damaged products, machinery, and structures.

### Accident Cost Ratio

Visible cost of in-plant accidents was reported as $1,400,000,000 for the year 1952, indirect costs at $1,500,000,000. These two together represent $2,900,000,000—an average cost per worker of $45 per year.

For plants with active safety-prevention programs the yearly cost per worker was less, but correspondingly higher for those plants that do not consistently guard against accidents and continually merchandise a workable safety program.

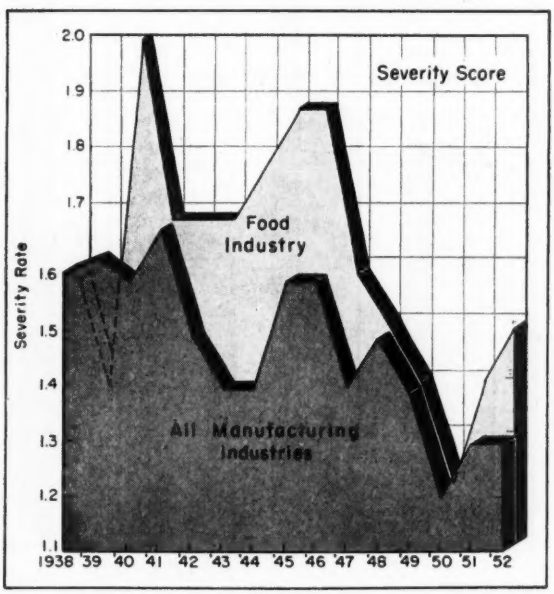
Also accounted in the visible costs are estimated wage losses of $850,000,000, medical expenses of $220,000,000, and insurance overhead costs of $320,000,000.

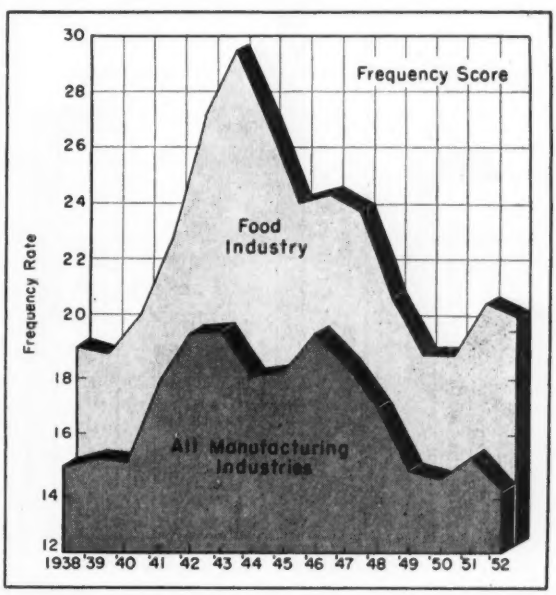
The indirect costs include the money value of damaged equipment and materials, production delays, and time losses of other workers not involved in the accidents.

From a humanitarian viewpoint and also from one of dollars-out-of-pocket, these data point to our indutry's great need to reduce accidents. Even for a temporary period, it is costly to replace an experienced worker. And, the fact should not be overlooked that the labor barrel is close to empty—except for the newest generation of inexperienced youthful starters, labor rejects, and the unemployables.

Encouraging, therefore, is the fact that those firms that have made a concerted and unrelenting drive to eliminate accident hazards, and which have built safety consciousness in employees have, as a result, greatly reduced time losses due to accidents. They have, thereby, reduced expenses and increased production efficiency.

Stimulating also are the lower 1952 injury rates of




**OUR CURVES** for severity and frequency generally parallel those for all-manufacturing—but go far above them. Accidents tend to rise after companies add new workers in expansion periods.

those food companies reporting to the National Safety Council, as compared to the overall food-plant rates reported by BLS.

The group of food companies reporting to the Council is making constant effort to minimize accidents in their plants.

Bureau of Labor Statistics reports cover many times as many companies as report to National Safety Council. While some of the organizations reporting to BLS have effective accident-prevention programs—many, however, do not. Or they pursue some type of program only half-heartedly.

BLS reports show that accident *frequency* in the whole food industry runs approximately 40% above those plants reporting to National Safety Council. And accident *severity* for the whole group is about 50% above the rate of those food companies reporting to the Council.

The accident situation in the food industry certainly is a challenge to management.

When measured against the score for all manufacturing the 25-year strike record of the food industry is relatively commendable. During this period food companies provided employment for 9 to 10% of all-manufacturing production workers. In addition, food operations accounted for a slightly larger percentage of the man-days worked.

Nevertheless, man-days lost in the food industry due to work stoppages have been less than 5% of the total lost by all-manufacturing during the last 25 yr.

The current record likewise is noteworthy. In 1950, the food industry employed 9.1% of the production workers. These employees accounted for 9.4% of man-hours in the manufacturing industries.

The food industry's work stoppages, however, were but 6.8% of the total, involving only 2.9% of all striking workers in manufacturing plants.

Futhermore, food's 3% of all man-days lost due to work stoppages compares most favorably with food's 9.5% of total man-hours worked.

## ★ AND NOW—GF PLANTS DEMONSTRATE WAY TO LICK THOSE ACCIDENTS

Enviable though the standing of the food industry may be among manufacturers, man-days lost during 1950 due to strikes would have kept a food plant with 2,800 production workers running full blast for a year.

Though food's share of man-days lost in 1952 was still lower (2.9%), lost time would have sustained production for 52 weeks in a plant with 4,800 workers.

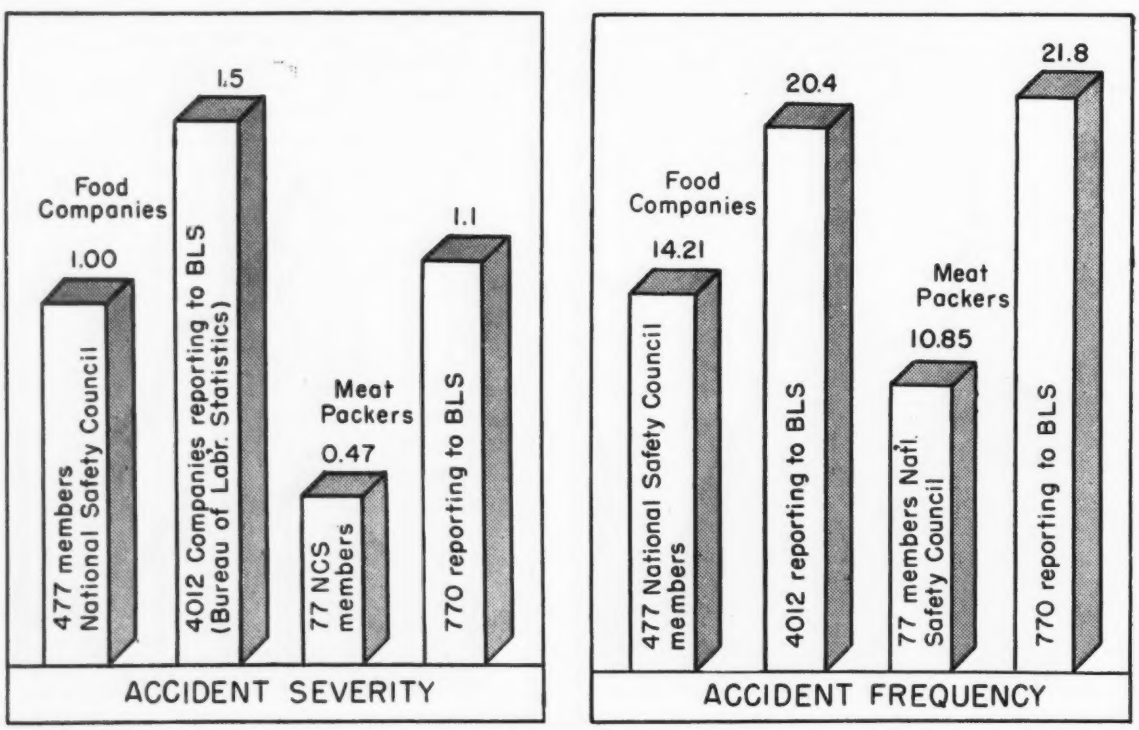
During most of the depression years, average annual wage scale of the food industry was above that of all-manufacturing. Since 1939, however, the food-company wage scale has been below average, dropping behind as much as 20% in 1943 and still lagging in 1952 by 9.4%.

Counterbalancing lower wage rates are higher fringe-benefit payments—approximately $630 a year per food-plant worker, against a $599 average for all-manufacturing. These figures are based on a survey made by the Chamber of Commerce of the United States.

But wages and benefits together do not bring worker compensation in the food industry to the average level of all-manufacturing.

Unionization has not materially affected the food industry strike record one way or the other, with the possible exception of the "conversion" year 1948. Union movement initially made more rapid strides in other manufacturing industries. Currently much of our in-

(Turn to page 161)




**CONSIDERABLY LOWER** are the accident severity and frequency rates of food companies reporting to the National Safety Council—that is, those with active prevention programs. Enough said!

**SAFETY INSTRUCTION** of supervisors is conducted by Author Deile. His graphic blackboard charts accent prevention, spotlight hazards and responsibilities.

# Management's Plant-Safety Drive Zeros Lost-Time Accidents

Perfect record chalked up at two GF factories—and maintained over two years! . . . "How-to-do-it" pointers that will help you cut production losses, slash insurance premiums, and also boost employee morale

**A. J. DEILE**
Training Division, Department of Personnel Administration,
General Foods Corp., White Plains, N. Y.

Down to zero went lost-time accidents at General Food Corp.'s Maxwell House plant in Hoboken, N. J. Thereafter, this factory, employing some 1,000 workers, remained entirely free of time-losing accidents for over two years—in short, for more than 4,600,000 consecutive man-hours.

Further, one of GF's smaller plants, with 70 employees, duplicated this enviable record.

How was it done?

Not by wishful thinking, not by edict.

►**Freedom from accidents was attained only by positive-action procedure, planned in minute detail and executed with intent, enthusiasm, and concern by every employee from top to bottom.**

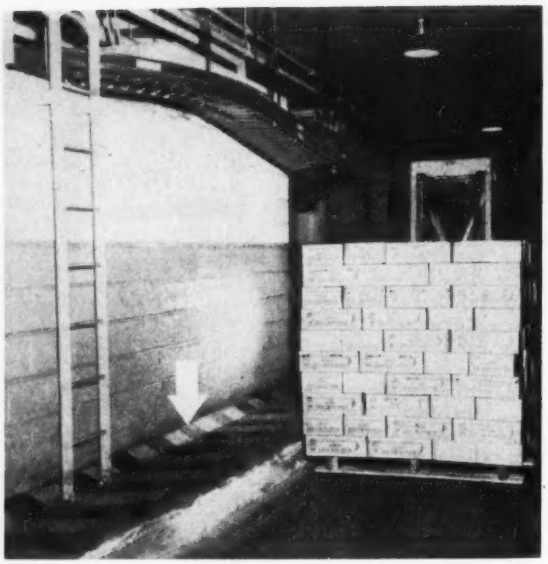
Many valuable do's and don'ts can be learned from the experience of these two organizations and from their determined endeavor to put an end to lost-time accidents.

## Job for Management

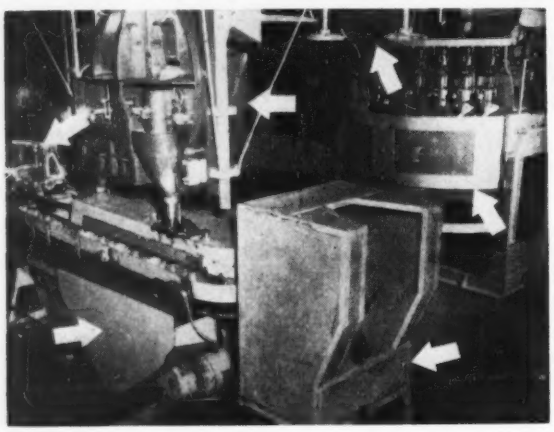
Unless the executive heads of a company are fully aware of the costs of accidents, and unless they display an outright determination to put an end to worker injuries, the best planned program is destined to failure.

Details must be weighed. As a part of the safety program at Maxwell House, conventional safety posters were purchased and displayed in strategic areas throughout the plant. But it soon became clear that it would be a mistake to put major dependence upon posters. Experience demonstrated that such display pieces—no matter how ingenious or how widely distributed—do not in themselves guarantee a real lowering of the number or cost of accidents.

**OUTSTANDING** company safety record is billboarded at entrance to Maxwell House plant. This aids in keeping employees safety conscious.



**"BE CAREFUL HERE!"** is message flashed by vivid cross-hatch coloring (arrow) in hazardous traffic areas and on threatening projections.



**WHEREVER NEEDED** to protect workers from accident-hazard parts of machines, safety guards (arrows) are installed. They're made of metal or plastic.

Their service is in the field of reminder-advertising—which is truly effective only after a strong safety-habit pattern is formed.

To reduce loss of time due to accidents to near zero requires understanding and awareness of plant hazards on the part of every employee. It calls for a driving determination on the part of everyone, from top to bottom, to prevent accidents.

Achievement of such a safety attitude is no overnight accomplishment. And the launching of a carefully-planned program will not make accidents disappear as with the wave of a wand. Invariably, the decline in accidents, both in frenquency and severity, is gradual. This is true even with unrelenting pressure for improved safety (and unrelenting it must be).

### Steps in Program

Once the decision is made by the responsible executive that an insistent effort will be made to cut down accidents, the program, to be successful, must be executed and administered down through the regular management channels.

Whether a full-time safety director and staff is assigned, or whether these duties are executed by a management employee as a part-time job, full responsibility in the drive must rest with the first line of management—foremen and supervisors. Obviously, whatever authority is necessary to gain the objective must be invested in those held responsible.

Function of the safety director, whether serving part or full time, should be strictly advisory. He reports to top management and coordinates activities through the personnel department. Means and methods are suggested. And management executes. If he should attempt to execute, lines of authority would be crossed. As a result, foremen and supervisors would take the attitude "It's their job; let them do it. And we'll see if they're so smart."

On the other hand, if the program offered is well advised and presented, all members of management involved arise to the responsibility required. When management is fully and aggressively behind a workable safety program, workers will join with a conscientious effort to make the program succeed. They can be convinced that, relative to accidents, it is they who are always on the hot spot.

### Work of Committees

At Maxwell House, ten safety committees function constantly—one for each department. Each of these committees comprises 3 to 5 employees from the department represented. And each is headed by a foreman or supervisor.

These groups hold safety meetings on company time—each group making regular inspection tours of the department in which it works.

Membership on the committee is rotated every three months, so that as many workers as possible eventually serve as members. They are encouraged to feel that during the period they serve they are responsible for the safety of those working in their department.

It is one thing to be told about hazards and safety measures; it is still another to know about them through observation and discovery. After a worker has served on

a safety committee, he is more cautious than before, more safety-conscious.

Rotation of the committee activities provides the opportunity for a temporary employee-sojourn in the realm of authority and responsibility, with the result that objectives other than improved safety often are accomplished:

**1. Worker-foreman association improves communications both ways.**

**2. "On the team" activity improves morale.**

**3. And as accidents decrease, the plant becomes a more desirable place in which to work—both in safety of the employees and their feeling of "belonging" gained through repeated participation in activities. Thus absenteeism and turn-over can be reduced.**

We repeat: Plant safety does not just happen. It must be merchandised today, tomorrow, and every day. Management attitude from top to bottom needs to be "Promote", "Promote", "Promote". This applies particularly to those of the working line management—who must carry the greatest responsibility for program success.

Our supervisors and foremen meet regularly to discuss safety and the ways and means of assuring it. In these meetings they may be encouraged by top management, aided by suggestions from the safety director or his department. Here also, foremen and supervisors discuss common and interlocking problems of safety and make suggestions for improvements.

Out of these meetings, and those of foremen-worker committees in each department, have come many worthy ideas that have led to notable plant-safety measures. Here are a few examples—

- ▶ Signs that warn of dangerous areas or obstacles.
- ▶ Vivid painting of hazardous obstructions that can't be removed.
- ▶ Red-painting of backgrounds of safety guards—to catch the worker's eye if any guard is missing.
- ▶ Safety controls to stop machines when accident guards are not in place.
- ▶ Grounding of all machinery to prevent static—for though not of itself injurious, a static shock can cause a worker to fall or, through reflex, to be otherwise injured.

Probably one of the most effective safety devices employed is the regular "one-minute safety meeting." Consistently, just before a machine or a line is started, a foreman or a supervisor will call the production group together for a rapid highlighting of safety precautions pertaining to a line or its machines.

When you avoid accidents entirely—even though hazards are ever present—it is because everyone is keeping alert to the dangers and is constantly thinking safety.

This applies not only when on the job, but also during the hours when employees are away from work. On the average, more accidents occur away from the job than on it. And resulting man-days lost are greater—at least 5 to 1. Let's spell it out—

## Off-Job Accidents

As reported by the National Safety Council, about 34,500 workers were killed off the job in 1952—fully 5% *more* than in the previous year. About 15,000 workers were killed on the job, 6% less than the number in the previous year.

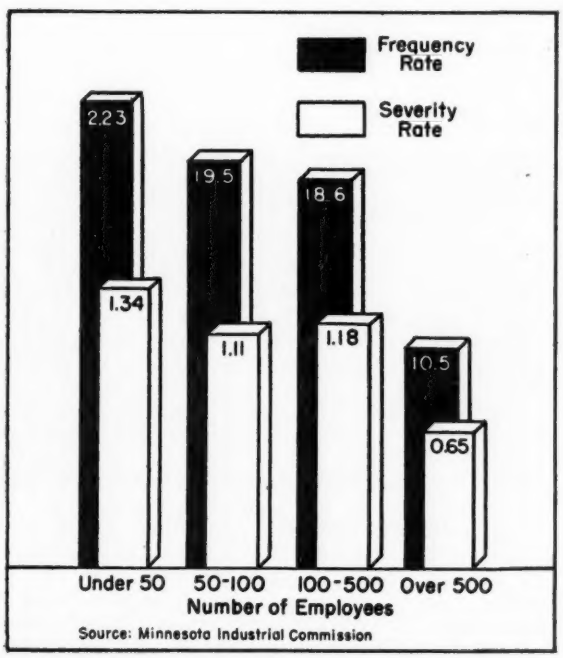
Here we see the working of the trend; for ratio of off-job to on-job fatalities has risen from 1.8 to 1 in 1945 to 2.3 to 1 in 1952.

Non-fatal injuries to workers off the job totalled about 2,600,000 in 1952, while on-job injuries ran about 2,000,000. Here, too, injuries off the job have increased since 1951, while injuries on the job have decreased.

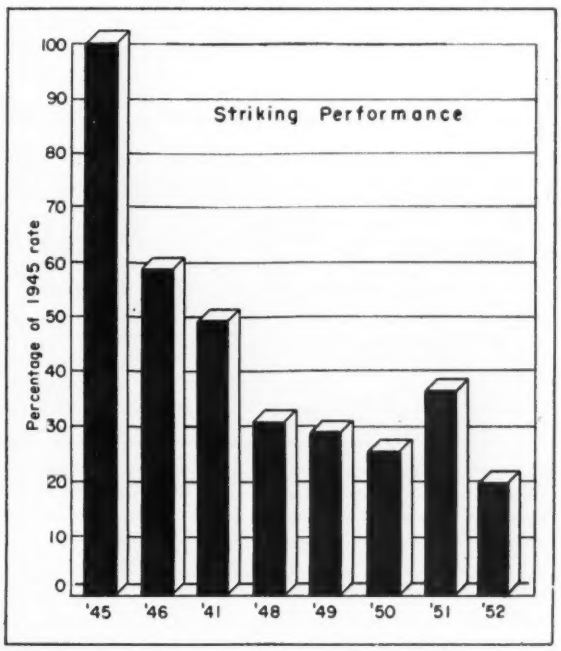
An example will illustrate the good off-job influence when an efficiently-fashioned safety program becomes ingrained in the worker's consciousness—

On a Monday morning, one of our foremen struck up a conversation with our safety director. "Over the weekend," he said, "I was chopping some wood. Once when I raised the hatchet with my right hand, I held it poised over my head with a heck of a funny feeling. It was looking down at my hand dangerously holding the piece of wood at which the hatchet was aimed. And I thought, 'What if the safety director saw me doing this? He sure would have the goods on me—and it made me creepy, too, to know that I could have lost my hand'."

(*Turn to page 186*)

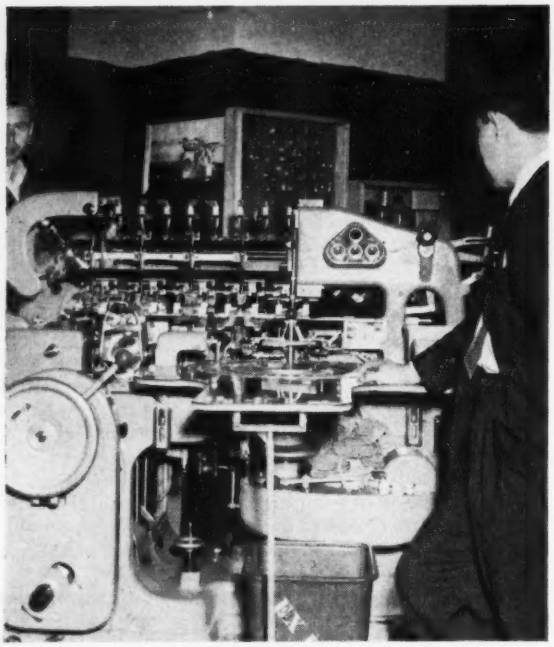



**INJURIES** oftener, more severe in small plants.




**GF'S** accident rate ('45-'52) dropped fully 80%!

**COMBINATION** die pop and wrapping machine omits manual handling between forming and wrapping. Feeds, sizes, cuts, forms, inserts stick, seals in sandwich-type wrap, and ejects pops in continuous rotary operation. Output: 225-250 per min. Variable-speed control. —Chocolate Spraying Co., Chicago. (72A)



**FOIL WRAPPER** handles regular and irregular shaped fragile items at 180 per min. Can feed two different type candies at same time. Has added features for banding, labeling, crimping, automatic print register, and applying easy-opening tape. Displayer: Peerless Confectionery Equipment Co., N. Y. C. (72B)

# New Candy Machines on Display

## Units that save labor, material, and changeover time—up sanitation and safety, too—take the spotlight at NCA Show in Chicago

FOR TODAY'S CANDYMAKERS, the recent 28th Confectionery Industries Exposition, in Chicago, was "right on the beam."

Here was an assortment of high-speed, versatile wrapping machines for hard and fragile candies of all sizes and shapes. Some units were equipped with attachments for performing multi-functions—bunch-, twist-, and sachet-wrapping; labeling and banding; printing and automatic print register; and applying easy-opening tape.

On one machine, two different type candies—"fragiles" like cordial centers—could be fed for tight-foil wrapping. Then there was a combination die pop and wrapping machine designed to eliminate breakage, while abolishing need of three girls to transfer pops between die pop and wrapping units. Attachment for wrapping is synchronized and fully automatic for straight-line production at 250-per-min. output.

Costwise, the candymaker was impressed with the five new chocolate coaters designed for high-volume output of quality goods. These units are built to fit in small floor space, and to permit quick cleaning and changeover. The manufacturers cite efficient operation free from troubles.

Also on view were two new stainless-steel revolving panners built to simplify work. One is designed for fondant-coating of fruit cordials without need for skilled operators. The other features a flush-type valve to simplify the job of discharging panned goods from the unit.

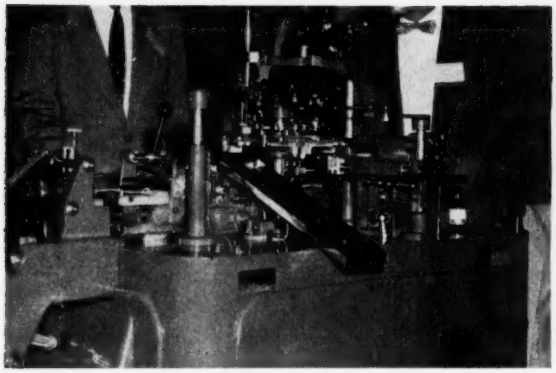
Displayed for the first time was a continuous mixer that produces 75 lb. of marshmallow per minute. Unit has no moving parts.

Durable, sanitary, lightweight handling units—trays, portable trucks, racks, and ingredient bins—also were highlighted.

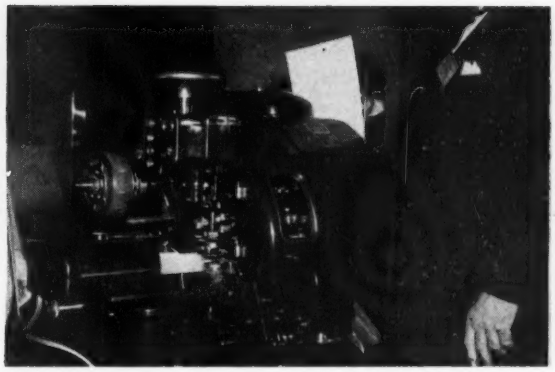
Exhibited, too, were new conveyor and packing belts to give top sanitation and more efficient performance. A Teflon-coated Fiberglas belt was offered for its non-sticking properties and ability to withstand process temperatures up to 500 deg. F. A Nylon-coated fabric belt for cooling tunnels reportedly provides glossier bottoms to coated goods. Polyethylene-coated canvas belts and plaques offer more easily cleaned, greaseproof, and non-cracking surfaces.

**For more information on confectionery units, turn to Reader Service coupon facing page 224 and circle key numbers shown beneath items.**

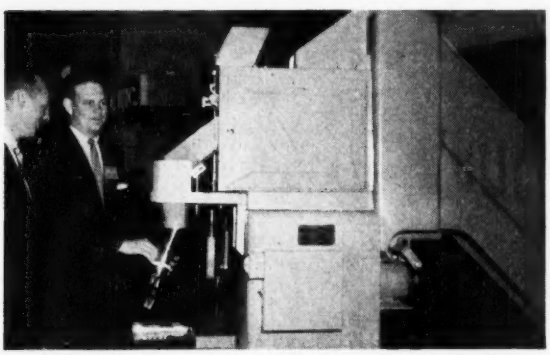
## Candy-Wrapping Units



**125-PER-MIN.** foil-wrapping and banding unit handles many vari-shaped items. With minimum moving parts, it has central lubing, "no product-no wrap" device, rapidly interchangeable insert-parts. Maker: Wilhelm Rasch, Koln-Braunsfeld, Germany. Displayer: T. C. Weygandt Co., N. Y. C. (73A)



**NEW** bunch-wrapping machine handles vari-shaped hard candies at speeds up to 180 per min. Trip gear prevents waste of wrapper material when there is no candy in rotary disk feed pocket. Continuous lubrication is through rotary oil pump. Exhibitor: Package Machinery Co., E. Longmeadow, Mass. (73B)



**ELEC-TRI-PAK** net weigher, with feed elevator, fills into bags, cans, jars, or cartons. Weighs fraction-of-ounce to 5 lb. Speed: 25-30 per min. Has parallel, vibrating bulk and dribble feed trays. It is stated that changeover takes only few minutes. Maker: Triangle Package Machinery Co., Chicago. (73C)

**COMBINATION** feed elevator and net weigher (single head) has speed of 30 bagged items per min. Elevators can be employed to feed more than one weigher. Variable-speed drive controls material flow. Features changeover of both product and container. Manufacturer: Frazier & Son, Clifton, N. J. (73D)

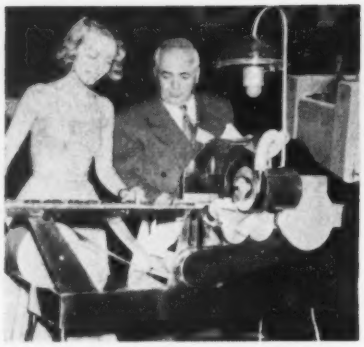
## Depositor and 4 Chocolate Coaters

**SMALL,** accurate depositor has stainless steel, water-jacketed hopper (40-lb. capacity), with agitator, electric heating, and thermostatic control. Piston and valve easily removable. Inexpensive distributing nozzles are quickly regulated and fitted to adjustable pumping system. Output of single-nozzle unit: 30 deposits (4 oz.) per min. into stainless molds, hand-made to close tolerances. Displayer: Geveke & Co., N. Y. C. (73E)

**SHORT-SIZE** (5 in.) coater is especially designed for small candymaker. Easy-to-operate unit requires little floor space. Coater swings back on hinges to permit quick cleaning and changeover. Belt travels 2 ft. per min. Output of continuous machine is up to 600 lb. per day. Draw-off valve permits draining of coating. Flow pan, chocolate blower, and drip-feed filling hopper easily removed.—W. C. Smith & Sons, Phila. (73F)

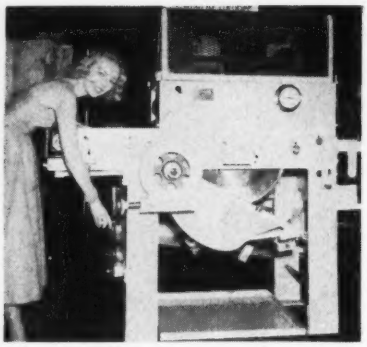
**Continued**

## Chocolate Coaters (Cont'd)



**7-IN. COATER** quickly can be changed from full to half-coat goods. Chocolate electrically heated and temperature controlled. Chocolate pan is easily lifted for rapid cleaning. Adjustments are made outside of machine.—National Equipment Corp., New York City. (74A)

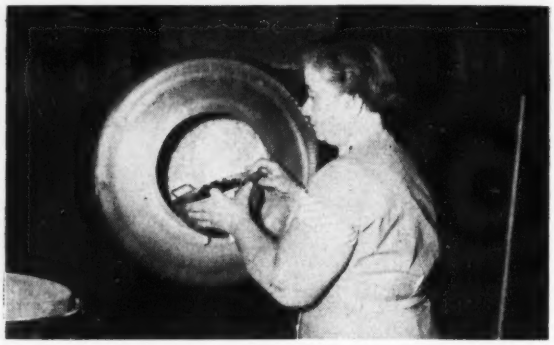
**12-IN. COATER** is adjustable for single or double chocolate curtain. Output: About 800 lb. of coated pieces daily. Speed: 30-120 ft. per min. Features automatic sheet-paper feed, quick changeover is reported, with easy accessibility for cleaning.—Geveke & Co., N. Y. C. (74B)



**16-IN. COATER** is designed for small manufacturer. Simple-to-operate machine affords either full or partial enrobing. Hand-operated wheel lowers chocolate tank for easy cleaning or reloading. Speed of belt: 5-8 ft. per min. Manufacturer: National Equipment Corp., N. Y. C. (74C)

## 2 Labor-Saving Revolving Panners

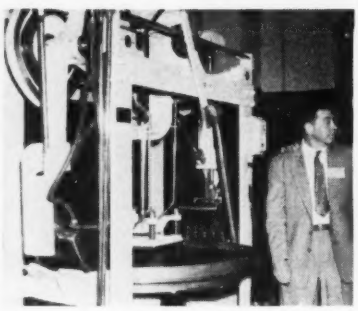
**STAINLESS STEEL** revolving pan features flush-type valve on bottom of unit to simplify and speed emptying of contents. Formerly, goods had to be manually emptied from pan with aid of shovel or bucket. Manufacturer: Groen Manufacturing Co., Chicago. (74D)



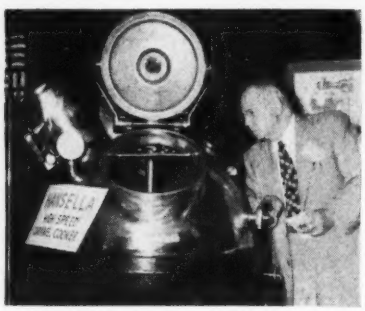
**STAINLESS STEEL** (16 gage) revolving pan was built to produce properly shaped centers with inexperienced help. Covers fruit with fondant or produces cream filbert, cream almonds, and spiced nuts. No corners or crevices, so hence easily cleaned.—Robert E. Savage Co., Chicago. (74E)

## 3 Top-Efficient Candy Mixing Units

**WHIZOLATOR** produces up to 75 lb. of marshmallow per min. at any desired sp. gr. Also turns out 200 gal. of light soya frappe in 45 sec. Pipe system for jet-mixing, atomizing, and filter-dispersion employs no moving parts. Manufacturer: Paul F. Beich Co., Bloomington, Ill. (74F)

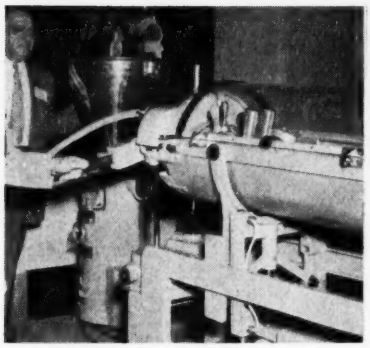


**BATCH MIXER** operates quietly and smoothly due to finished-cut cams and needle-bearing cam rollers. Turntable, scoops, and cleaver are water-jacketed. Unit is sturdily built to withstand continuous, heavy-duty operation.—National Equipment Corp., New York City. (74G)

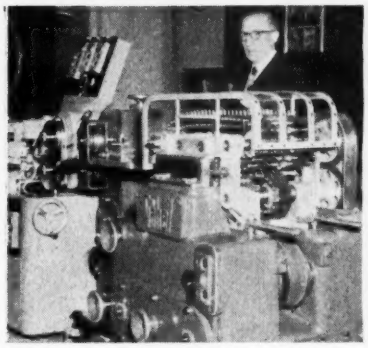



**COOKER-MIXER** is designed to eliminate burning of caramel batches through use of vertical beater shaft with mixing blades covering all heated surfaces, patented comb-type beater, electrically operated remote control signaling thermometer. — Vacuum Candy Machinery Co., N. Y. C. (74H)

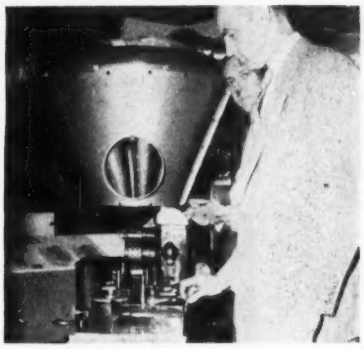
## 5 Specially Designed Hard-Candy Units



**AUTOMATIC** center-filling unit (left) has electrically heated, agitator-type hopper. New batch roller (right) features six electrically heated rolls. Maker: Haensel-Junior, Hannover, Germany. Displayer: Peerless Confectionery Equipment Co., N. Y. C. (75A)

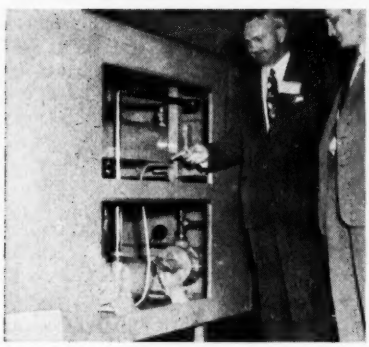


**NEW** electrically-heated, adjustable rope sizer (left) simplifies rope feed from batch roller to latest plastic former (right). Speed: 39½-118 ft./min. Forms variety of solid or filled candies. Shown by Peerless Confectionery Equipment Co., N. Y. C. (75B)



**VERTICAL** batch feeder and sizer features automatic rope-feed control. If feed to wrapping machine is too fast, rope stretches and actuates trip that speeds up batch feeder. — Hansella unit, exhibited by Package Machinery Co., E. Longmeadow, Mass. (75C)

## Advanced Chocolate Cooler and Shaver, Also Vacuum Cooker

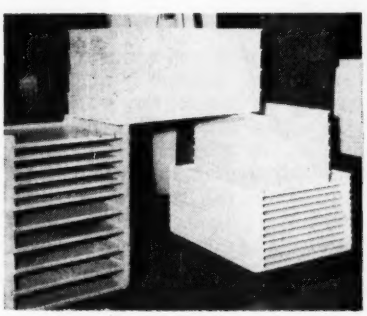


**COOLING TUBE** feeds coating unit with chocolate that's free of unstable crystals and consistent in temperature. Chocolate is pumped between outer circular shell and inner rotating tube, with cooling water circulated on outer side of the shell and inside of the tube. J. W. Greer Co., Wilmington, Mass. (75D)

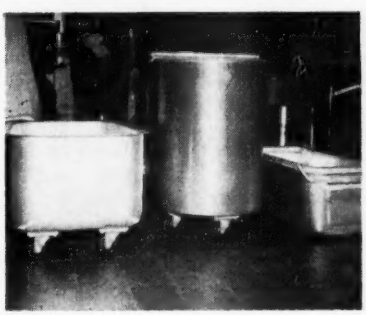
**BLOCK SHAVER** features all-metal hopper with adjustable guides for width and thickness of blocks. Hopper is hinged for access to knives. Safety cut-out switch stops motor. Used for medium and large blocks of chocolate, cocoa butter, fondant. Output: 11,000 lb. hourly.—Geveke & Co., N. Y. C. (75E)

**GAS VACUUM COOKER** features hydraulic kettle lift and kettle transfer for simplification of batch handling. Handles batches from 25 to 120 lb., and output up to 3,000 lb. daily is afforded. Turn of handwheel locks kettle in vacuum position. — Manufacturer: Vacuum Candy Machinery Co., N. Y. C. (75F)

## Handling Units That Stress Sanitation

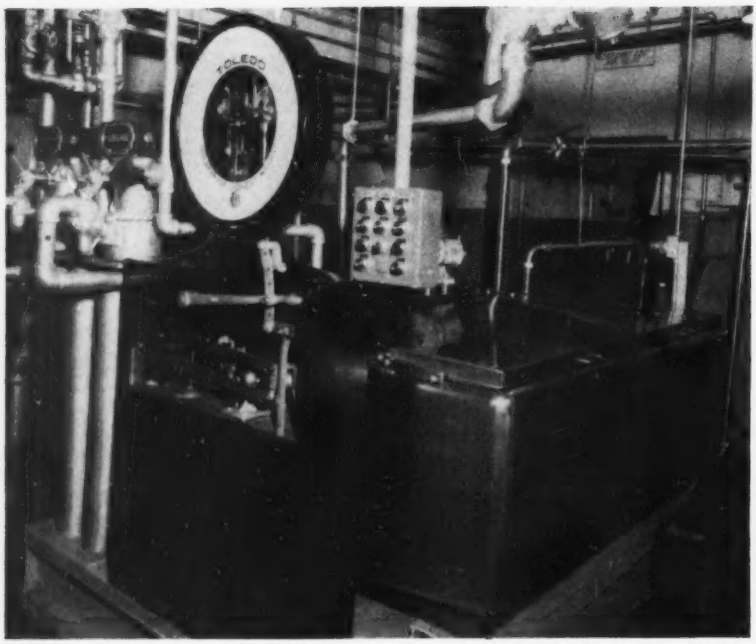


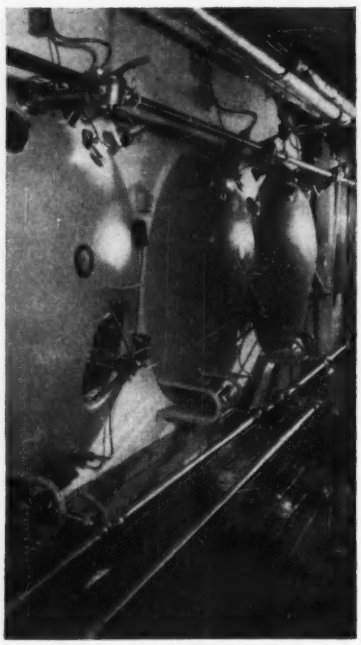
**GLASS FIBER TRAYS** serve as efficient intra-plant handlers. Trays are light in weight, durable, and washable. —Molded Fiberglass Tray Co., Linesville, Pa. (75G)



**SANITARY** truck (left), ingredient bin, and toting box (right)—are of aluminum alloy. Corners rounded, no seams. — Aluminum Cooking Utensil Co., New Kensington, Pa. (75H)

**STARCH TRAY ENDS** are made of aluminum casting with spring clips. Replace former wooden ends that tend to break. Nails eliminated. Maker: Robert E. Savage Co., Chicago. (75I)



**CENTRAL CONTROL** by operator at weigh can includes automatic syrup meters (left of scale) and milk and cream addition through push buttons and overhead hand valves. Processed mix routes to wall-flush tanks (right).

## Profit Through

# Pump-and-Pipe Processing

Detroit dairy achieves major cost reduction along with quality boost by "fluidizing" batch mix system and augmenting with C.I.P. sanitation.

**J. R. FRYE**
Field Engineer, Cherry-Burrell Corp., Chicago

Management at H. A. McDonald Creamery, Detroit, like many makers of high-quality variety food products, faced a typical dilemma last year.

Comparing its vat-pasteurizing ice cream operation with more mechanized HTST processors starkly showed up needed economies. But the batching system was flexible and put out fine ice cream. Further, a good deal of money was invested in basic equipment that would have to be junked in a major change.

Solution to this poser came through adopting parts of the new while adroitly re-engineering the old. Why not augment the desirable basic vats with some pipe and pumps plus a bulk-scaling system and thus approach the economies of volume short-time operations? It would be like having ones cake and eating it.

**The end-result is evident today in the revamped mix room which retains the old system's ability to handle varied product in modest runs, yet has fractioned supervisory costs.**

Essentially, the heart of the new system is a 5,000 lb. Cherry-Burrell weigh-can equipped with two-speed sweep agitator, and balanced on a dial-reading Toledo scale. With this indicating "volume formulator" it became possible to go to piped ingredients, central supervision, and, eventually, sequenced operation of subsequent pasteurization.

Setting this key weigh can, with its normal sub-floor mounting, might have been an overly costly operation in itself. McDonald got around this by basing the unit on a concrete slab. A galvanized iron shield and extending skirt was added to protect exposed edges and the oil-filled base from water. Also included was a condensate drain.

All ingredients are now delivered to weighing station through sanitary piping from storage tanks located at wall-ends of the area. Milk, condensed, cream, and skim-milk are pumped by push-button control from an Allen-Bradley station adjacent to the scale dial. When formula weights of each are delivered, attendant manually stops pump operation and closes respective line valves.

Corn and cane sugar come in liquid bulk to the plant and are tank stored at controlled temperatures. These, however, are fed to the weigh can through two Smith meters which are pre-set by the attendant. Syrup pump is manually started but automatically shuts off at the selected delivered volume.

It should be noted that the accuracy of these automatic syrup meters has been excellent—they check out very closely when compared on a weight basis.

When the semi-automatic formulating system was placed in full operation, observers were astounded with its

speed and accuracy. Here is a cycle for a typical mix, timed-out with a stop-watch:

A. Cream, 1,146 lb.–pumping time 2 min. 11 sec.

B. Condensed, 846 lb.–pumping time 1 min. 28 sec.

C. Milk, 1,178 lb.–pumping time 3 min. 20 sec.

D. Corn syrup, 18 gal. and liquid sugar, 67 gal.–pumping time 2 min 6 sec.

Thus, with all hand valve operations included, it only took a few seconds over nine minutes to formulate 4,130 lb. of mix.

Accuracy of the system exceeded previous vat formulating. In its first two weeks of operation, averaging from five to nine batches a day, it was only necessary to re-standardize three lots of mix. Since then, with the attendant now familiar with the system, re-standardization is practically an unknown work.

Formulated mix is discharged from the weigh-can by a positive pump into a series of three 500-gal., sweep-agitator equipped, pasteurizing vats. As product is pumped in it is heated. When the vat is full and reaches 160 deg. F., a 30 min. holding period ensues before pasteurized mix is pumped through an homogenizer and over a cabinet cooler to reduce its temperature to about 38 deg. F. Cool mix is then held at this temperature, until use, in a cold wall storage tank.

### Continuous Operation

While the dairy is not fully exploiting this possibility as yet, it does enjoy the mechanics of a system which would permit essentially continuous movement of mix from formulation, through pasteurization, to holding.

Continuous operation, with three pasteurization vats, involves a matter of timing. Product from the weigh-can must pump into a vat, and vat temperature must be brought up to 160 deg. F. in the space of ½ hr. Then, following the holding period, pasteurized mix must be pumped out by the homogenizer within the next ½ hr.

Thus the three vats are filling, pasteurizing, and emptying in sequence, and the homogenizer is running continuously.

Balancing out such a continuous system is predicated on three things:

1. Ability of weigh-system to provide formulated product steadily and in proper volume–this is no problem at McDonald.

2. Ability of processing vats to raise temperature of mix to pasteurizing as they fill–the vat processors easily accomplish this through good design.

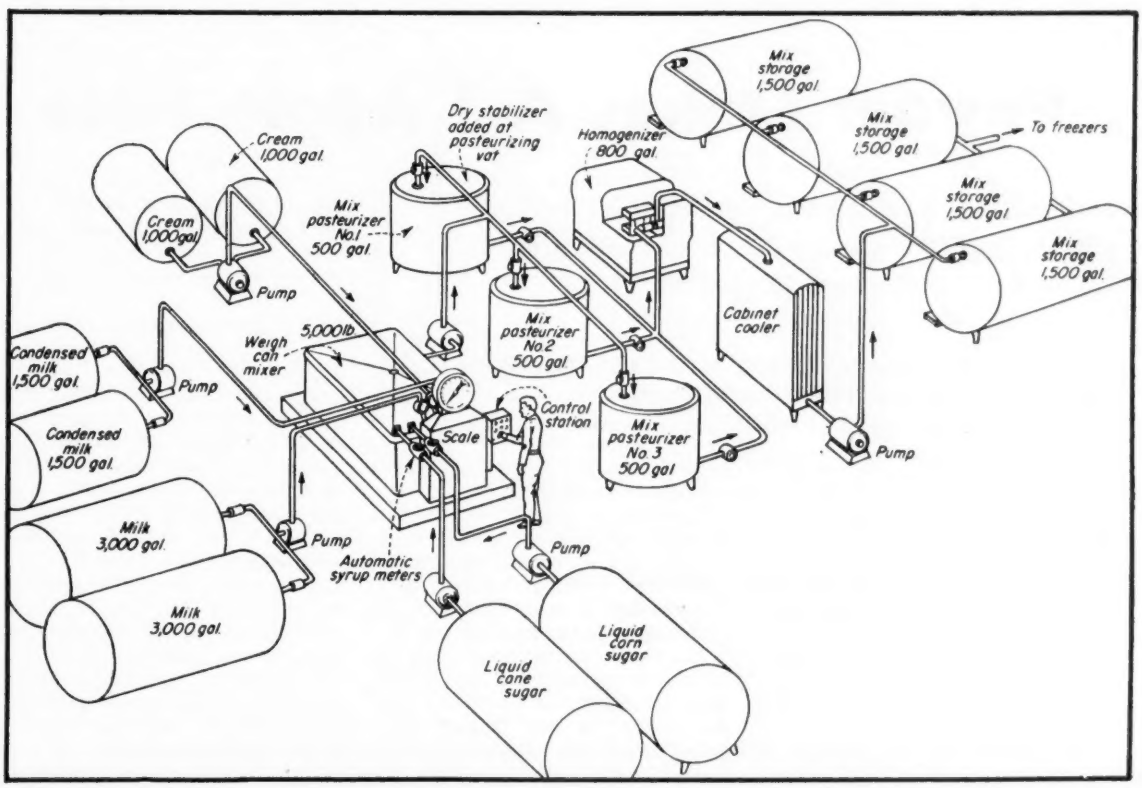
3. Capacity of the homogenizer–at present McDonald is using a 800 gph. homo., but a 1,000 gph. unit could be employed in order to discharge a 500 gal. vat in ½ hr.

When you get down to cases it is interesting to note that a batch pasteurizing system operating in this continuous fashion can very well equal the throughput of a HTST system. Employing the McDonald system at maximum capacity (assuming a 1,000 gph. homo.), for example, would supply this company with about 6,000 gal. of mix in an 8-hr. day–or the equivalent of about 12,000 gal. of ice cream.

In addition to the basic mix-making-system it was found feasible to install a CIP (cleaned-in-place) circulating system to sanitize the over 1,400 ft. of stainless steel pipe required to handle all liquid ingredients. This, along with the elimination of former can sanitation in batching, has drastically reduced man-hours in clean-up.

As a matter of fact, it is estimated that the new mix operation–along with the increased storage space it provides during the summer months–saves the full time services over two men.

One added sidelight is that the mix operation weigh-can has also found ideal use in this dairy for standardizing and preparing coffee-, whipping-, and half-and-half cream.




**MIX ROOM** layout at McDonald Creamery Co. takes advantage of remote and wall-disposed bulk storage tanks to move ingredients through pipe to central mix tank. Mix then pumps via compact process to holding storage.

# Powder Makes A-1 Apple Juice

Reconstitutes in cold water within 90 seconds to provide quality beverage . . . Desiccant curbs lumping . . . Process steps detailed

**HOWARD I. SINNAMON, VICTOR A. TURKOT, RODERICK K. ESKEW and G. W. MACPHERSON PHILLIPS**

Eastern Utilization Research Branch, Agricultural Research Service, USDA, Philadelphia

A powdered apple juice product that yields a beverage of excellent fresh fruit flavor now has been developed by USDA.

Here, a 4-oz. can holds about 100g. of the new powder, which dissolves, with stirring, in 5 cans of cold water within 1½ min. This provides some 25 oz. (12.5 deg. Brix) of a beverage very closely resembling the drink prepared from the concentrate before drying.

The powder has an apparent, or bulk, density of about 0.9g. per ml. and a moisture content around 2.7%. Being hygroscopic, it must be processed in a low-humidity atmosphere in order to avoid lumping.

Moreover, to prevent this condition in subsequent storage, there is included in the can a desiccant envelope containing anhydrous calcium oxide. The envelope is made from a tough, sift-proof, moisture-permeable paper.

This new powder-drink development is an extension of prior USDA work on dehydrated fruit juice powders. Strashun and Talburt[1] dehydrated various juice concentrates in a "puffed" form and then added back natural flavoring constituents. Eskew *et al*,[2] dried a sweetened Concord grape juice concentrate containing added natural flavoring constituents and reported that a beverage prepared from the powder possessed good flavor.

## Pilot-Plant Process

*Apparatus:* Here, the apple juice concentrate was prepared using equipment similar to that described in an earlier publication by Eskew *et al.*[3] This was dried in a vacuum tray dryer of conventional design. Cast-iron platens were supplied, with water controllable at any desired temperature from tap water to 200 deg. F.

Dryer trays were of #18 gage stainless steel with No. 4 finish. Vacuum was provided by an oil-sealed rotary type vacuum pump equipped with an oil clarifier for removing water continuously. Water vapor from the dryer was condensed inside the tubes of a vertical surface condenser.

The dried juice was ground in a small laboratory-size hammer mill running at low speeds and with a coarse

screen of slot openings ⅛ in. by ⅝ in. The finished powder with desiccant envelopes was packaged in size 202 x 214 (4-oz.) cans. This grinding and packing was done in a specially designed cabinet where ambient relative humidity was reduced below 15% before the dried mass was brought into it. Cans were sealed with a small hand vacuum double seamer.

*Preparation of Concentrate:* Fresh apple juice was pressed from a blend of 1 part Northern Spy, 1 part McIntosh, 1 part Stayman, and 2 parts Jonathan apples. The juice was then stripped of essence, depectinized, clarified, and concentrated as described,* except that the concentration was increased to 83 deg. Brix. Brix-acid ratio of the concentrate was 24.2, acid being expressed as malic.

*Formulation of the Concentrate for Drying:* Powders of three formulations were made for evaluation by a trained taste panel. Powder "A" was dried from full-flavor apple juice concentrate —that is, concentrate containing the essence originally recovered from the fresh juice, and without addition of sugar or acid. The beverage from this powder had an excellent fresh-apple flavor.

Powder "B" was dried from a concentrate containing added sucrose equal in weight to the apple juice solids, citric acid to provide a palatable Brix-acid ratio, and an amount of essence to maintain the essence solids ratio characteristic of apple juice. The beverage from this powder had an excellent fresh-apple flavor equal to, or slightly better than, that of powder "A".

Powder "C" was dried from a mixture of the same composition as "B", except that dextrose was substituted for sucrose. The beverage from this powder was decidedly deficient in apple flavor compared to the other products.

Although the beverage from powder "B" was not significantly superior to that from powder "A", the use of sucrose as an additive offers advantages. Because sucrose does not enter into the reactions which develop off-flavors, it may be expected to lessen deterioration of the product during drying and storage by the mere dilution of the apple juice solids. Also the cost of the product is reduced by substituting some sucrose for the more expensive apple juice solids, thus tending to expand the market for apple products.

As a result of the taste-panel findings described above, the 83 deg. Brix apple juice concentrate was formulated for drying as for powder "A"—that is, by adding sucrose (as 83 deg. Brix solution) in an amount equal to the apple juice solids, citric acid solution to provide a palatable Brix-acid ratio, and essence in sufficient quantity to maintain the essence-solids ratio of fresh apple juice.

*Drying:* The mixture, now at about 80 deg. Brix, was spread onto the stainless steel dryer pans with a loading of 0.9 lb. of concentrate per square foot of pan area. Previously, the pans had been coated with a thin film of appropriate wax (such as Johnson's Corrosive Inhibitor Wax*) so that the material could be easily removed after drying.

The pans were placed in the dryer, the dryer door closed, and the concentrate brought to 160 deg. F., as indicated by thermocouples. The dryer then was evacuated and the material dried under conditions illustrated in our accompanying chart.

Drying commenced with vigorous foaming of the concentrate when the absolute pressure inside the dryer had reached about 7 in. of mercury. The foam rose to a maximum height of about 2½ in. A portion of the log of a typical run (accompanying table) illustrates the relationship of concentrate temperature and absolute pressure during the foaming period.

After the foam had subsided, the concentrate temperature began to rise from 115 deg. F. In about 30 min. temperature of the material reached 160 F. and was maintained at this level for the duration of drying. Total elapsed time from start of foaming to start of cooling was 130 min.

The absolute pressure inside the dryer, which had reached 0.6 in. of mercury at the end of the foaming stage, was reduced to 0.35 in. after 84 min. of operation, corresponding to a boiling point of about 47½ F. for water. The condensate, at about 47 F., now was removed from the receiver to preclude its boiling, and all further water vapor evolved from the concentrate was discharged through the vacuum pump. From this point to the end of the drying cycle the absolute pressure fell off to a low of about 0.20 in. of mercury.

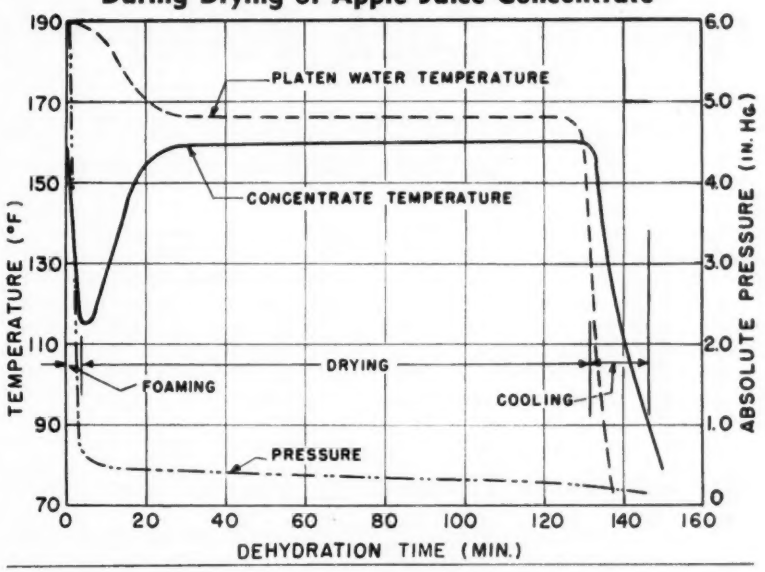
Platen water temperature was regulated as needed to adjust and maintain concentrate temperature. For instance, the concentrate was brought to 160 F. before drying by using platen water at

(*Turn to page 131*)

* Mention of products in this article does not imply USDA recommendation or endorsement over other products not mentioned.

## TEMPERATURE-PRESSURE RELATIONS

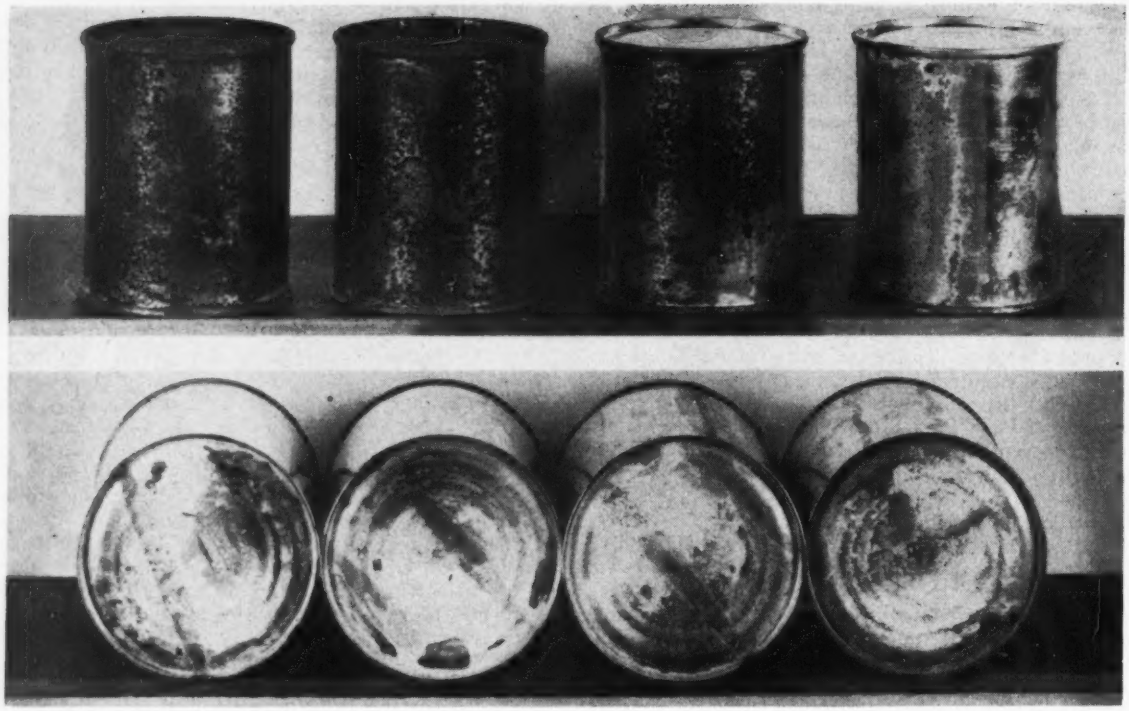
### During Drying of Apple Juice Concentrate




### And During Foaming Period

(Portion of Typical Log)

| Time (Min.) | Concentrate Temperature (Deg. F.) | Absolute Pressure (In. Hg) | Progress of Foaming |
|---|---|---|---|
| 0 | 160 | 7 | Foaming begins |
| 1 | 145 | 5 | |
| 2 | 130 | 3 | Foam reaches 2½-in. height |
| 3 | 120 | 1 | |
| 4 | 115 | 0.7 | Foam layer begins to subside |
| 5 | 115 | 0.6 | Foaming ends |



**RUSTING** of cans due to tin removal by an alkaline carryover. Top: Rusting confined to parts of cans directly contacted by alkali. Above: Solids deposited on ends.

# *How to Curb* Boiler-Water Solids

—before they "ride your steam" to corrode cans foul lines, ruin tubes, and fray general efficiency

ONE of the prime trouble-makers in cannery operation is carryover water from the boilers. Numerous difficulties stem from this source.

How does carryover occur? What are its effects? And how may it be controlled, with excesses avoided? These were questions highlighted in cogent talks by two prominent engineers at NCA's recent Canning Problems Conference in Atlantic City.

Speakers were Charles J. Schafer, of W. H. Betz, chemical engineers, New York City, and F. L. Blumenshine, California Packing Corp., Rochelle, Ill.

## Mr. Schafer on Foaming—

Condensed steam in the absence of objectionable carryover will have a pH slightly below 7, due to the presence of carbon dioxide. Such steam is only mildly corrosive to a tin-plated surface for the usual period of time that tin cans are processed. When objectionable carryover is taking place, the steam will have a pH that may be considerably higher than 8.3.

As a result, this steam will be strongly alkaline and corrosive to metals such as aluminum, zinc, and tin. The corrosive action is indicated by etching and discoloration of the tin surface after completion of processing. Rusting of the cans then can take place readily, particularly after storage in a humid atmosphere.

Carryover also can cause deposits in steam lines, thus interfering with operation of valves and steam traps. In plants that produce superheated steam for power generation, carryover can cause deposits in superheater tubes and so lead to failure of the tubes. Carryover also can result in turbine deposits that will seriously reduce the turbine's operating efficiency.

In plants that operate at pressures above 400 psi. and which also run turbines, difficulty may be encountered with silica carryover. Caused by vaporization of silica from the boiler water, this is a problem distinct from the general carryover of boiler water solids. But it will not be further detailed here, since most canneries do not generate steam at pressures above 400 psi.

### Some Is Expected

A small amount of carryover is common to the operation of every boiler and is designated as normal carryover. This is the amount specified as permitted in the maker's performance guarantee.

Such guarantees describe the maximum amount of carryover either as 1 ppm. or a similar figure, or will describe carryover in terms of steam quality. When the guarantee is based

upon steam quality, certain other conditions relating to boiler water conditions are specified. A guarantee based on quality only may permit up to 17.5 ppm. of boiler water solids in the steam for operating pressures in the range of "zero" to 300 psi.

Table 1 outlines the specification for maximum boiler water solids as given in the standard guarantee of the American Boiler Manufacturers Assn.

The guarantee based on steam quality is the type usually applying to fire tube boilers in general and to water-tube boilers that do not contain any steam drum internals for steam separation and purification. When there is specified a small and definite limitation on steam impurity, such as 1 ppm., the boiler usually will be equipped with internal devices for purification.

### Causes Cited

Carryover may be due to both mechanical and chemical causes. The former include high water level, load characteristics, and lack of steam drum internals or leakage of the internals. For example high water level can be encountered in boilers not equipped with automatic feed-water regulators or in which the regulators are not adequate for load characteristics.

The chemical causes of carryover include high total solids content of the boiler water, high suspended solids, high alkalinites, and presence of materials that can promote foam formation, such as animal oils. There should be a careful appraisal of possible mechanical causes of carryover. And if possible, these should be corrected. This may require installation of feed-water regulators of a change in the type of such regulator. It may be necessary to install other automatic equipment to regulate the load. In extreme cases, installation of additional capacity may be required.

Where carryover primarily is from chemical causes, it frequently will result in other operating difficulties such as scale formation, corrosion in the condensate system, or caustic metal embittlement of the boiler. Called for is careful appraisal of the problem and future operating requirements to decide whether the installation of external water treating equipment is necessary. Within certain limits, suitable internal chemical treatment will suffice.

### Preventive Measures

Requirements for external treatment equipment will vary widely, depending upon chemical and physical characteristics of the water used as boiler makeup. Natural water sources vary broadly in characteristics, necessitating many different types of equipment. For example, clarification is desirable when the raw water contains suspended solids in the form of silt and organic matter.

Sodium zeolite softening will remove hardness producing salts such as calcium and magnesium but will not have any effect upon silica. Acid-regenerated zeolites can be used to remove hardness and alkalinity. If the raw water is high in suspended solids, clarification is required ahead of the zeolites.

Cold or hot process softeners of the sedimentation type will reduce hardness, alkalinity, and silica. With suitable water characteristics, such reduction can be obtained at very low operating costs for treatment chemicals.

Additional methods of external treatment include demineralization and evaporation. For instance, if sea water is the only available water source, evaporators ahead of the boilers are needed.

In a plant operating steam engines or pumps, the condensed steam is likely to be contaminated with animal oil. This will form foam-producing agents. Removal equipment can be employed to lower the oil content to very low values.

Installation of external treating equipment normally involves a sizable capital investment. Evaluation of the problem by a water-conditioning consultant is advisable, with investigation for future requirements of the plant as well as for the immediate needs. Future increases in operating pressure or capacity should be considered.

Rarely is carryover the only boiler-water problem encountered. Probably the most common operating difficulty is formation of scale or adherent sludge on boiler heat-transfer surfaces. Some form of phosphate is employed in most boiler plants to reduce scale and sludge formation troubles. But many plants have found that use of phosphate alone increases rather than decreases the carryover problem. Internal treatment of boiler water therefore should be undertaken as a complete problem. In short, these matters should not be considered as unrelated difficulties.

### Foam Control

Highly effective organic anti-foam agents have been developed in recent years. The most effective ones are somewhat complicated chemically. However, slight alterations in their structure makes considerable changes in their ability to control boiler-water foaming. In general, the polymerized esters, alcohols, and amides are the best developed to date. Some, such as the alkaline polyamides, are substantially water insoluble and must be dispersed with other agents in feeding.

An example of results obtained with and without the use of chemical anti-foam agents is illustrated in accompanying chart. Without an agent, objectionable carryover took place when total solids in the boiler water reached approximately 3,000 ppm. With use of an agent, boiler water solids could be carried to nearly 16,000 ppm. before objectional carryover took place.

These agents must be applied with an understanding of their limitations. In many cases boilers can operate at very high concentrations of solids without objectionable carryover. But from a practical standpoint, this would not be advisable, since the concentrations may be far in excess of the quantity permissible for maintaining clean internal boiler surfaces.

Use of an agent may allow boiler operation with exceptionally high alkalinity in makeup water and prevent alkalinity from causing carryover. This, too, may not be desirable. High alkalinity in the feedwater may cause excessive corrosion of condensate piping or impart embrittling characteristics.

Many boiler plants have been able to obtain reasonably satisfactory results in scale prevention with shot feed of the internal treatment chemicals. Others report poor results. As a general principle, best results will be obtained when boilers are operated with both continuous chemical feed

## Troubles Defined

**"Carryover" describes the condition of steam when it includes excessive boiler-water solids. And "foaming" and "priming" are two terms pertinent to it.**

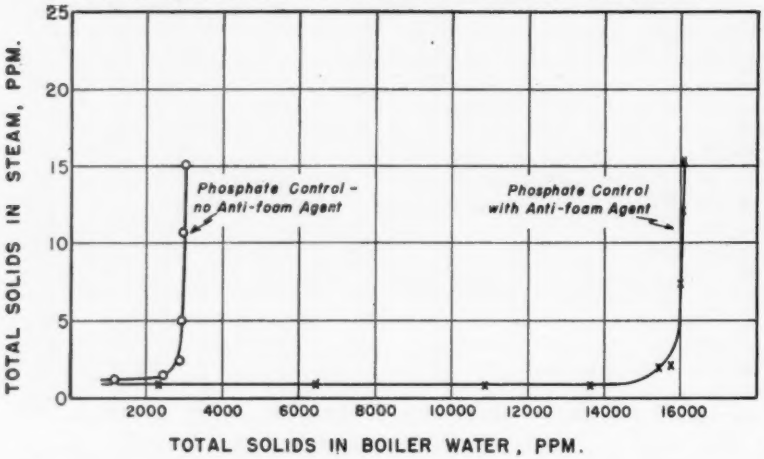
**FOAMING is formation of bubbles on the surface of the boiler water. It may entirely fill the steam space of the boiler. Or it may be only several inches deep.**

**PRIMING generally is considered a violent surging type of action in which the steam contains slugs or fairly large quantities of boiler water. It can occur when water level in the boiler rises to the steam-discharge nozzle.**

**YOU SHOULDN'T HAVE MORE SOLIDS THAN LISTED HERE**

| Operating Pressure Psig. | Total Solids Ppm. |
|---|---|
| 0- 330 | 3,500 |
| 301- 450 | 3,000 |
| 451- 600 | 2,500 |
| 601- 750 | 2,000 |
| 751- 900 | 1,500 |
| 901-1,000 | 1,250 |
| 1,001-1,500 | 1,000 |

HOW CHEMICALS AID IN AVOIDING CARRYOVER TROUBLES




and continuous blowdown. Most modern boilers are provided with the necessary connections. For older boilers they usually can be made by plant personnel.

Basic method of measuring solids in steam is by gravimetric determination. This involves evaporation of relatively large quantities of condensed steam in order to weigh the residue. Required is a trained and skillful analyst and considerable time for completion of each determination. An alternate, and usually preferred, method is measurement of specific conductance—the electrical conductivity of water. This is an indirect method of gaging total solids.

Specific conductance will not measure suspended solids or organic materials that do not ionize, or only ionize to a very limited extent. However, such solids almost always will represent only a small portion of those present in the boiler water. In principal proportion, the solids are inorganic salts that ionize to a considerable degree, particularly at the low concentrations in condensed steam.

It has been demonstrated that, within the limits of measurement significant in boiler operation, the concentration of dissolved salts in water is directly proportional to specific conductance.

Simple, rugged equipment has been developed to measure specific conductance. It can be used for checking spot

(*Turn to page 130*)

★ ★ ★

# "Brass Tacks" on Business

# *For Your Employees*

**Pointed study courses—such as offered in the meat field—boost the abilities of personnel by getting them down to fundamentals . . . win extra values by broadening their concepts of American enterprise**

**IVAN C. MILLER**
Associate Editor, "Food Engineering"

No business is in a better position than the food industry for providing enlightening information to employees on the full gamut of basic business economics. For here is a vital, highly competitive industry operating on a low profit margin.

**And by educating your workers in the economics of manufacturing your products, you do more than increase the production value of these employees. You impart a thorough respect for your business, and for American business in general.**

One fruitful approach to the economic perspectives of employees is through training courses of industry associations. Take, for example, the educational program offered to employees by the Institute of Meat Packing, University of Chicago.

Jointly sponsored by the American Meat Institute and the School of Business of the University of Chicago, it was started more than 25 years ago. And to date more than 11,000 meat-packing employees have enrolled.

An employee can select and obtain corespondence-course training in any or all of the following subjects: Livestock Marketing, Plant Operation, Superintendency, Science, By-Products, Merchandising, Accounting, and Economics.

The Institute of Meat Packing mails out a 10-page leaflet detailing the home-study curricula and also describing how group studies may be arranged. The fee is only $7.50 per course and includes cost of the textbook, the lesson material, and the cost of grading the lessons and returning them corrected to the student.

Now let's examine the values of one of the courses, as now developed—the one on the economics of the meat packing industry. Similar subjects pertaining to your business would have like benefits.

Here, aim of the curriculum is to describe the pertinent economic characteristics of the meat packing industry. Stressed for the student are the current economic facts. And it is demonstrated how meat packers can increase their efficiency by knowing the dollar-and-cents fundamentals behind their operations.

As a sequel to the course covering marketing of livestock and meat, this specific study has particular appeal to executives, plant managers, department heads, and all those who are training themselves for such positions.

The ten main topics in this course are—

**1. Contributions of the livestock and meat field to the economy.**

**2. How livestock and meat prices are determined.**

**3. Livestock marketing margins.**

**4. Cattle and beef price trends and seasonal fluctuations by grades.**

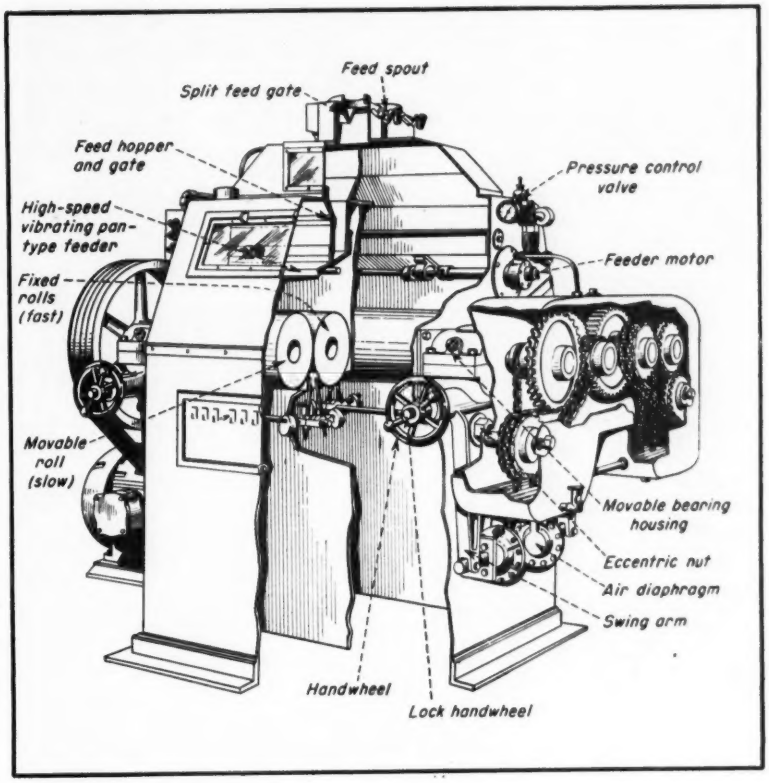
**5. Hog price trends and seasonal fluctuations.**

**6 Sheep and lamb price trends and seasonal fluctuations.**

(*Turn to page 144*)

**How Mill Operates Shown by Cutaway ➔**

Instant that in-flow opens adjustable split-feed gate on Air Set mill (Allis-Chalmers), electric relay signals solenoid to start motor. Free-swinging gate has weight control that compensates for feed fluctuations. However, motor and vibrating feeder do not start if stock is not flowing through feed spout. Flow of stock through split-gate inlet automatically actuates (through positive switch arrangement) high-speed, pan-type vibrating feeder with two control ranges (speed and amplitude) for volume and uniformity of stock going to rolls. Air motor is adjusted for light or heavy stocks. After feeder has started, control system works through air diaphragm to pre-set rolls for milling and maintains uniform milling pressure along full length of rolls. Controlled-pressure grinding eliminates unequal pressures common to spring tension. Whenever stock stops flowing or motor is off, rolls automatically open, saving wear. Calibrated jackscrew is pre-set for desired minimum distance between rolls for grinding. Lock mechanism maintains setting accurately and indefinitely.




# Air-Controlled Rolls Up Mill Efficiency

## Boosted capacity, better sanitation, and saving in vital floor space achieved with pushbutton-operated pneumatically-set units

**E. S. GILBERT**
Process Engineer, Processing Machinery Department, Allis-Chalmers Manufacturing Co., Milwaukee

It was a No. 1 teaser that was annoying executives at Saskatchewan Cooperative Producers, Ltd., Saskatoon, Canada.

How stretch capacity of their flour mill when there was no space on the roll floor for additional grinders?

This mill went into operation in 1950, producing 1,000 bbl. of flour daily and then inching up to 1,300 bbl. Demand for its products increased to such an extent that about a year later output had to be boosted.

But the only space where more roller mills could be added was on the sprouting floor directly above the roll floor. And this location provided a problem: Additional line-shaft driven mills could not be employed here inasmuch as there was not enough room underneath the floor for the line-drive shaft.

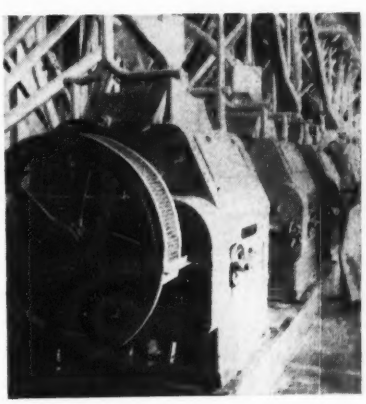
Repeatedly, then, the problem was weighed and the "ground gone over." Then eventually came the answer: Pneumatic mills.

**▶Wisdom of this choice was borne out by the new installation's top-efficient performance. Capacity has jumped over 50%. Sanitation has been augmented. And with the new equipment integrated into the process flow, all operations have gone forward smoothly despite the factors of expansion.**

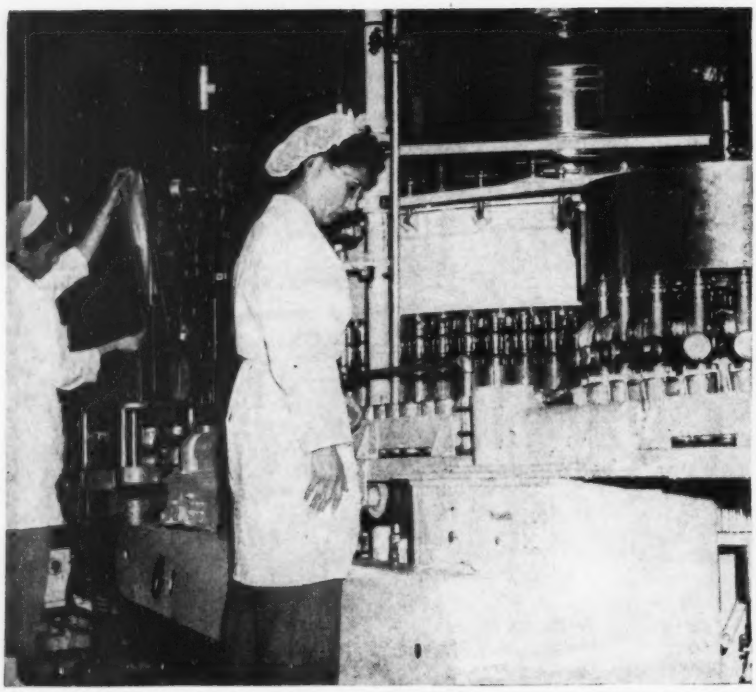
The new mills operate on a principle involving control of pressure. This pressure—of vital importance to accurate and uniform flour granulation—commonly has been maintained by springs, which are subject to some variation. Pressure in the new rolls, however, is maintained by air, and at the correct level.

Besides affording better control and uniformity, the new unit features protection of rolls from loose nuts, or the like that occasionally get into the machines. In the past, such objects damaged the chilled-iron rolls. How-

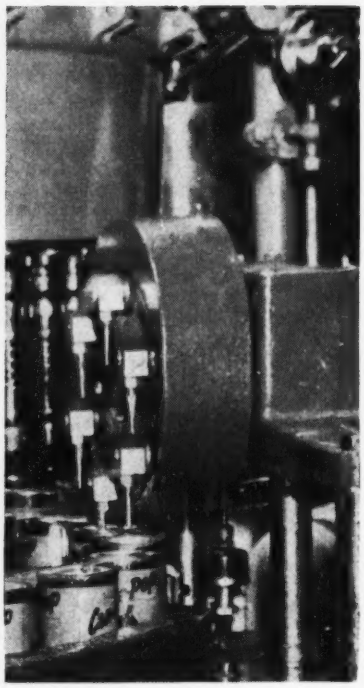
(Turn to page 132)



**BATTERY** of mills in action at Saskatchewan Cooperative Producers.



**NEWLY DESIGNED** pressure-type syruper (right), 60-spout carbonated water filler (center), can seamer (left) are closely integrated in operation.



**THE $CO_2$** jetter displaces headspace air with inert gas.

# *Rapid Headway* of Canned Pop

Take this operation started in a brewery: It now has three plants running, two more under construction, three others planned . . . Latest facility's capacity is 30,000 cases daily

**ROBERT S. KLEINSCHMIDT**

Quality Control Director, Can-A-Pop Beverage Co., Sheridan, Wyo.

Canned pop, the strange bedfellow Western bottlers recently found in their midst (FE Feb., p. 863), now threatens to take over much of the bed.

No longer to be considered as an interloper, this lusty young infant now is bursting the seams of his industrial pants. Three companies are operating in Los Angeles; the same number in San Francisco. Meanwhile, new plants are on-stream or abuilding in the East and Midwest.

What has created this spectacular surge from bottles to cans? Is it a sound and logical transition?.

Allen B. Rogers, president of our Can-A-Pop Co., with plants in Sheridan, Wyo., Peoria, Ill., and Compton, Calif., offers the following explanation:

"Let's glance at the past, then consider the present and future. Pop bottlers weren't strictly out of the woods when they gained public acceptance of the 10¢ bottle. They still faced a continually nagging problem — retail outlets weren't happy about refunding deposits and handling returned empty bottles.

"The streamlined self-service markets of today," says Mr. Rogers, "are geared to sell merchandise. They resist extra handling at the check-out counter that requires time of the checker. Pop in non-returnable cans fits into this operation and, from this time-saving standpoint, has gained the retailers cooperation."

Sheridan (Wyo.) Brewing Co., which Mr. Rogers formerly headed, has discontinued brewing in favor of pop canning. Further pointed out by this executive is the fact that in addition to the above mentioned Can-A-Pop plants, others are being built at Hutchinson, Kan., and Minneapolis, Minn., with additional plans for plants in Florida, Texas, and New York.

### New California Plant

Can-A-Pop at Compton, Calif., is the newest and largest addition to this company. It occupies a 75,000-sq.-ft. building, and has a rated daily capacity of 30,000 cases.

Sanitation in the semi-isolated syrup room, in which all equipment in contact with the product is of stainless steel, is an important operation. Flooring is of tile, walls are painted reinforced concrete, and the slightly damp atmosphere of the room keeps dust problems at a minimum.

All tanks, lines, utensils, and flooring are completely sterilized before operation with a dilute solution of chlorine, washed down with a mild detergent then rinsed with hot water. No smoking or eating is permitted in this room. Operators are attired in white coveralls and wear white rubber boots.

There are four 3,300-gal agitator

equipped syrup tanks. Four 100 gal. tanks are used for ingredients mixing. One of these is a vacuum type for transferring extracts, citric acid, and benzoate of soda solution into the larger tanks. Two Neptune automatic liquid meters are used to measure liquid sugar or water into the syrup tanks. Finished syrups are pumped to the syruper on the can line.

Due to hardness of the city water, and its soluble salts which could contribute off-flavors, water is treated in a conventional system. It goes first to softening tanks, thence into a large 30,000-gal. storage tank.

Here, various chemicals are added to bring it to proper requirements. Then it is passed through a sand filter, followed by activated carbon to remove excess chlorine, etc. Any small particles of carbon or sand that might have been carried through are removed by a polishing filter. Equipment was manufactured by Western Filter Co., Denver.

For syrup making, liquid sugar is pumped from the 25,000-gal., ultra-violet-lamp-equipped storage tank, located in the warehouse, to one of the 3,300-gal. tanks. Metering is semi-automatic. Operator sets dial for quantity required and, when this is delivered, meter automatically shuts off flow. Required amount of water is also metered into the tank from the filtered-water storage tank.

Flavor, citric acid, and benzoate of soda, having been measured in smaller tanks, are transferred by means of air pressure through the previously mentioned vacuum tank. Following mixing, syrup is pumped to the Liquid Carbonic syruper on the can line.

### Filling Operation

This syruper is unique in its field. It is a high-speed, 20-valve filler integrated with the 60-spout, carbonated water filler, and the can seamer. Valves are kept under constant pressure to assure exact quantity of syrup "throw." By adjusting the pressure, quantity of syrup fill may be easily changed.

Cans, with proper amount of syrup in them, then move to the 60-spout Liquid Carbonic filler that dispenses a predetermined amount of carbonated water. Extra $CO_2$ is jetted in headspace of each can as it moves along the track to the 360 can/min. seamer. Amount of $CO_2$ is regulated by pressure gage. Source of $CO_2$ is a liquid storage tank.

Cans are supplied in cartons and cases direct from Pacific Can Co.'s, Los Angeles plant. (Continental Can Co. supplies Peoria plant.) These cans are coated and will withstand the higher acidities of carbonated beverages and provide good shelf-life.

First the cans are dumped on an unscrambler that feeds them to can tracks. Just prior to reaching the syruper, they are steam-cleaned, hot-water rinsed, then pass under banks of ultra-violet lamps (located in a tunnel) to be sterilized.

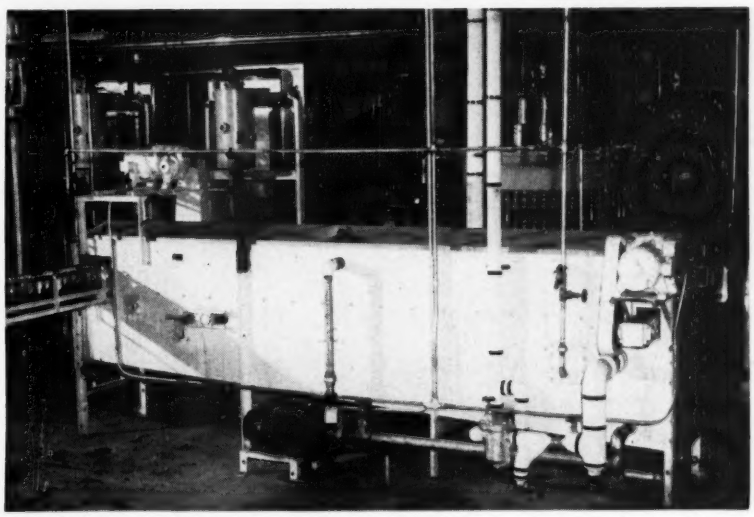
Canned product moves from seamer to a re-heating unit that sprays on hot water to increase product temperature to a point high enough to retard formation of condensate on outside surfaces. Upon emerging from the re-heater, cans get a blast of compressed air that dries them by removing most of the residual water.

Following code-dating, cans move through an FMC can weigher that ejects any underweight ones. Then they go to the 6- or 24-can packers.

Supplied by the Dacam Corp., Charlotte, N. C., the 6-can packaging units operate automatically. Each has a capacity of 25 per min., automatically casing the cans in lots of eight. An operator is required to provide a case for the 24-can packer. Cases are conveyed to Standard Knapp gluing-sealing units, then palletized for easy handling in storage and for shipment to retail outlets.

Finished beverages are analyzed and tested in a completely equipped laboratory. These tests concern product carbonation, air and iron content, bacteria and yeast counts, total acid, fill, color, taste, sugar content, pH, examination of the vinyl linings of cans.

## Filled Cans Are Dried, Then Cased

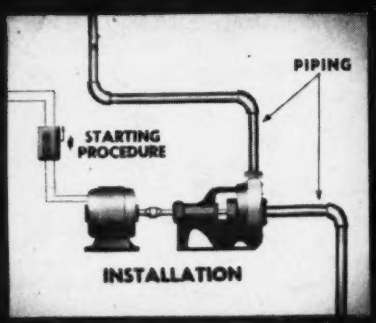


**RE-HEATER** uses hot water sprays to increase temperature of canned product, thus retarding formation of condensate on outer surfaces of cans.

**SIX-CAN LOTS** are assembled and automatically packed in carry-home cartons. Latter are conveyed to casers and packed eight to a case.

# PUMP MAINTENANCE

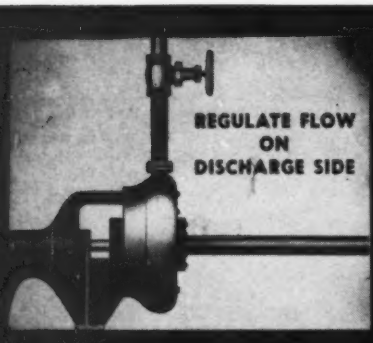
Here are some down to earth tips on how to maintain your centrifugal pumps. The illustrations are taken from an Allis-Chalmers slide-film, and the text is based upon the film's commentary.




**1** In using centrifugal pumps, the nub of the matter is to set them up right in the first place. Then follow through by checking from time to time to make sure the original conditions remain and the pump is getting the reasonable care it should have.

**2** Take an interest in this science of pumping and pump performance. Build up your knowledge of pumps, at least to the point where you will know enough not to open a priming petcock while the pump is running. Learn what they will and won't do.

**3** In setting up, you must consider three points: pump installation, piping and starting facilities. Ideal suction piping would consist of a straight tube from the supply to the pump. Such a set-up usually is impossible, but don't go to the other extreme . . .

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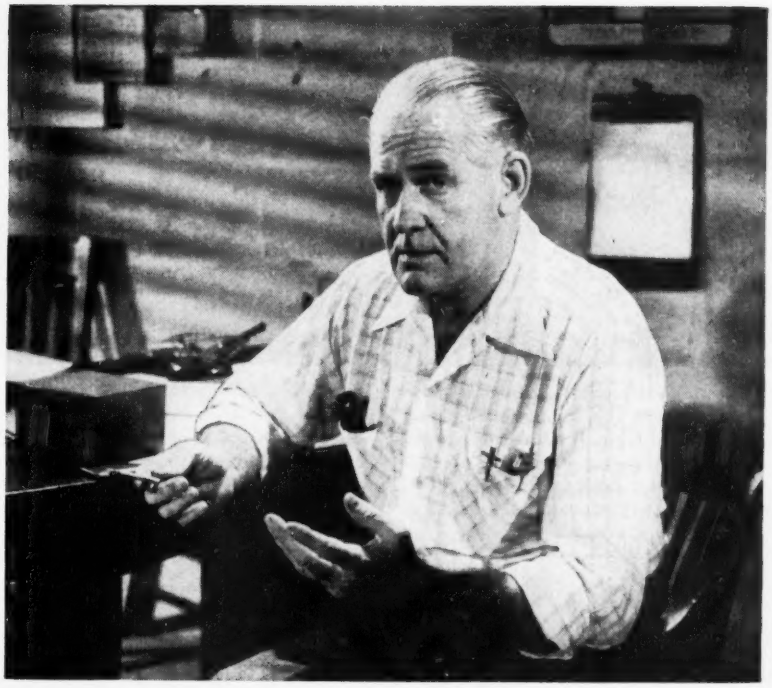
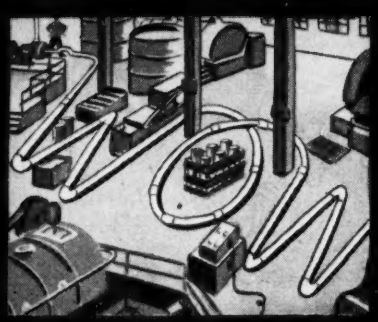
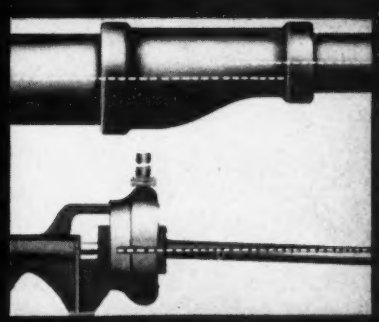
**7** Regulate the flow on the discharge side, not the suction side. Any regulating valve should be on the discharge side. Then if it is closed, the water supply to the pump will not be shut off. The only exception is the . . .

"From what I've learned as a maintenance supervisor, I'd be glad to give you some hints on good practice to help you get longer life and better service from your centrifugal pumps."







**4** WOW! You'll have to be sure your lines don't just grow like Topsy. Any time you spend in intelligent planning of the layout will be more than repaid in better pump performance. In any event, when you plan a pump, make every effort to . . .

**5** Keep it simple! Use as few bends and elbows as you can get by with . . . you'll have to study your own pumping requirements to find the best pump location in your own particular plant to meet the specific conditions entailed.

**6** And another thing comes to mind. Keep all suction piping sloping downward away from the pump to keep air out of the lines. Install reducers flat side up for the same reason. Air in the suction line will cause the pump to lose prime.

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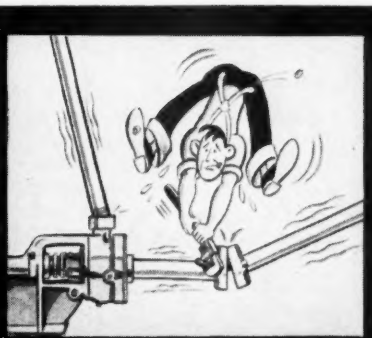
**8** Foot valve at the intake of the suction line. When the pump stops, this valve closes and traps liquid in the suction line to keep the pump primed. It should have a strainer to keep trash out of the pump.



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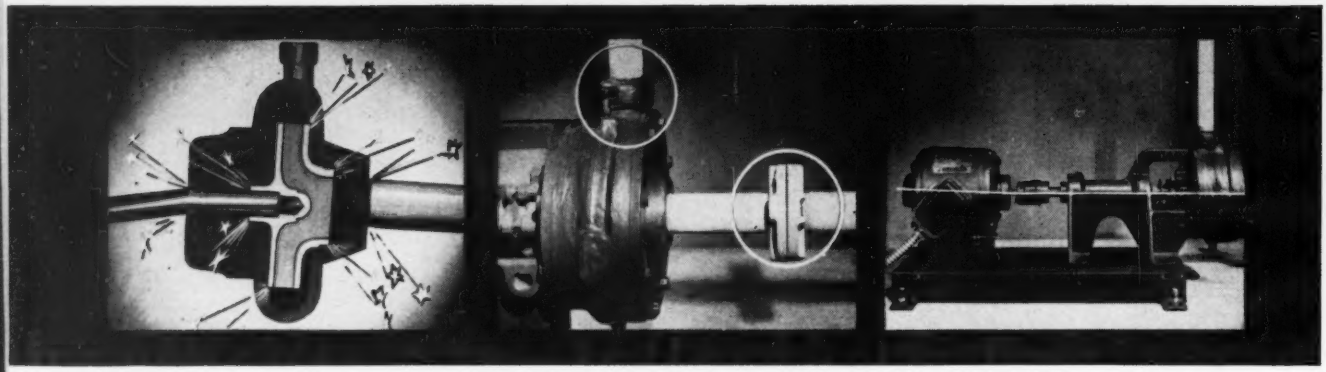
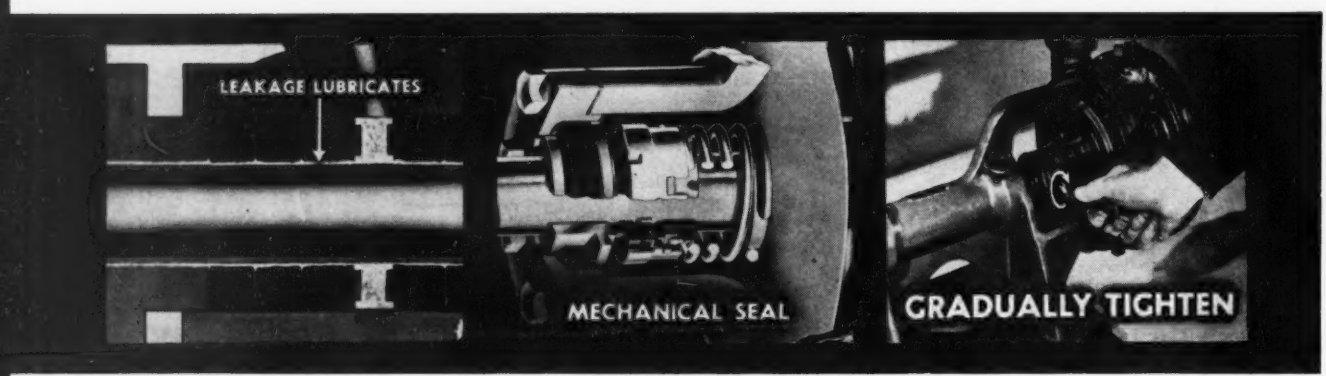
**9** Don't ever do this, please! With enough muscle power, you probably can scrunch everything together, and in all probability the pump then will run. But, you won't have to wait long until . . .



**10** . . . your pump will be seriously injured by the abuse. Remember, the time you spend in planning the installation and properly setting up the pump will be repaid in better performance, and lower maintenance costs.

**11** Here's the way to do it. Suction and discharge lines are of the proper length and they enter and leave the pump without strain. Also, it's a good idea to use pipe compound at all joints to keep air out of the system. This practice ups efficiency.

**12** Correct alignment really begins with the mounting. When pump and motor are out of line, the bearings and shafts of both pump and motor are strained, and you get excessive wear, vibration, and noise. All three can be avoided.




**16** . . . leakage lubricates the packing. The material being pumped finds its way out along the shaft in just the right amount to keep the packing from drying out, thereby extending its useful life. Other pumps may have . . .

**17** . . . mechanical seals that present no lubrication problem. In any event, when a pump equipped with a stuffing box is running, there should be a drip from the packing. If there is more than a slow drip, then take your wrench and . . .

**18** . . . gradually tighten the gland until the leakage is right. A word of warning: Never let a pump run dry. Therefore, be sure it's primed before you start it. This may mean filling the suction lines and pump casing by external means.

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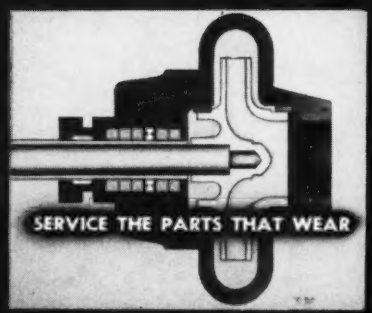
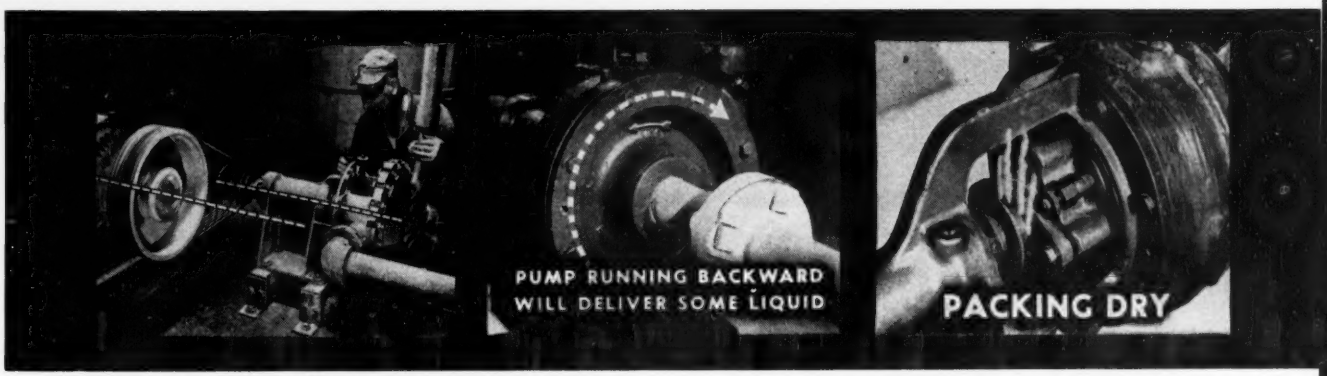
**22** If pump efficiency falls off, suspect the wearing rings in the casing. They are designed for relatively easy replacement and they have a striking influence on the efficiency of the pump. They can be removed by heating the casing or chilling the ring.

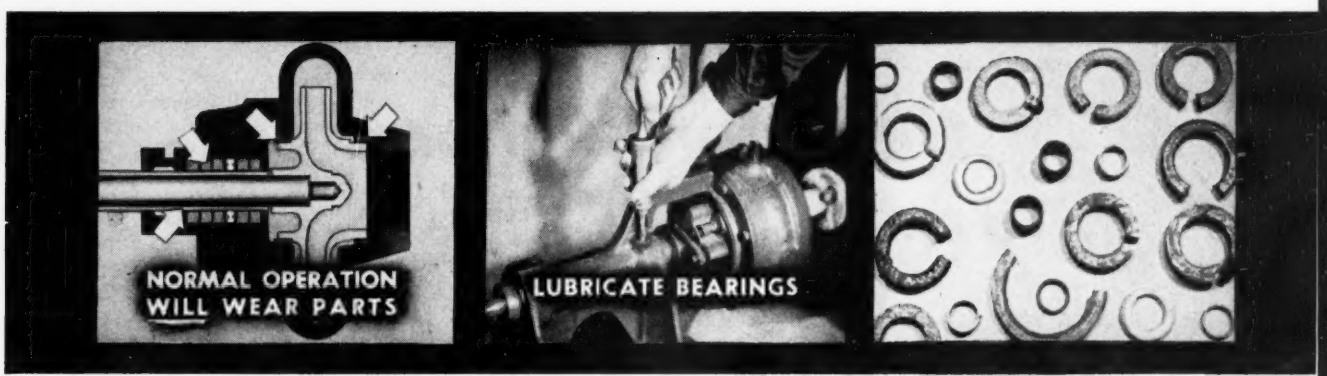





**13** However, with V-belt drives you need only reasonable alignment between the two sheaves because minor misalignment can be taken up in sheaves and V-belts. Bear in mind that good alignment means minimum belt wear, too.

**14** Be sure the pump runs in the right direction. A pump running backward will deliver some water, but it won't deliver anywhere near its rating. That's why you should check the manufacturer's instructions to find out which way it should turn.

**15** Then look at the stuffing box. If the packing runs dry it will burn out and it can score the shaft sleeve. Packing keeps the water in and the air out. Sometimes it is lubricated under pressure, and of course, sometimes . . .



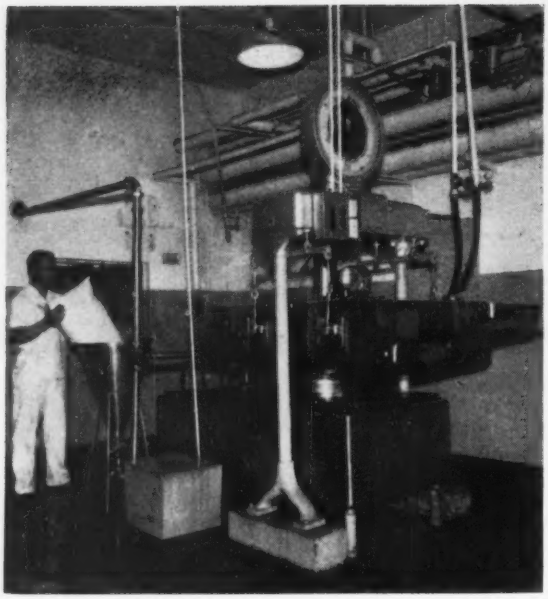

**19** Normal operation will wear out some of the parts. They should be checked periodically and replaced when they are worn too much to do a good job. And check again to see and assure yourself that set-up conditions "stay put."

**20** Bearings will have to be lubricated. Use enough of the right kind of tube, and that means not too much. Too much lubricant can defeat its own purpose by stirring up excessive friction, which is particularly true in anti-friction bearings.

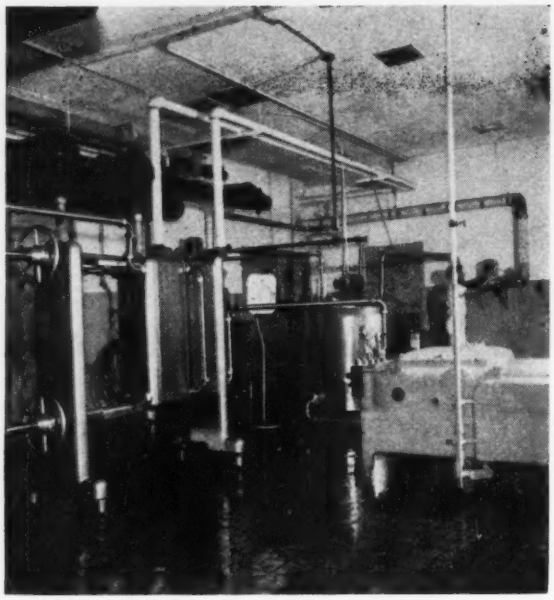
**21** When the time comes to replace packing, remove the old, clean out the box, then be sure to put in the right kind of packing! Stagger the packing joints about 90 deg. so the liquid can't find a straight path through the gland.

**23** In short, your pump-maintenance program should concentrate on servicing and replacing the parts that show wear in normal operation, such as packing and wearing rings. Periodically inspect and clean the impeller.

**24** To be happy with your pumps, set up a schedule for their care, keep tabs on how they're performing and—never let them run dry! The essentials of good pump practice in a nutshell are: Set them up right and give them good care.



**1 DRY INGREDIENTS** are poured into mixer (left) and incorporated in weighed quantity of water by recirculating from 2,000-lb. mixing tank (foreground). Then mixture is pumped to 500-gal. pasteurizing vat.



**2 VEGETABLE OIL** and liquid sweeteners are metered into dry-mix in pasteurizer (rear). Mix is heated to 165 F., held 15-min., homogenized, cooled to 38 deg. in plate unit (left), discharged to holding tanks.

# *New Plant Tailored*

# To Vegetable-Oil "Ice Cream"

**Exclusively producing and packaging high volume of fast-growing product it's designed for ready expansion . . . Employs efficient dairy-type units in operation that features corrugated 3-gal. cases, palletized handling**

**ARTHUR J. REITZ**
Frozen Desserts Inc., Los Angeles

Built solely for the manufacture of vegetable fat "ice cream," the year-old plant of Frozen Desserts Inc., Los Angeles, is setting a sharp pattern for efficient production of this new dessert.

Operating under California License No. 1, it began production in May 1953. Public acceptance of the product, then distributed by two companies, was beyond original expectations. And now that the state law covering sale of this product has been clarified, demand is increasing steadily.

## Dairy Equipment Used

With the exception of the vegetable oil storage tank, all the new, modern equipment is identical with that found in an up-to-date ice cream plant. However, use of corrugated cases, for half gallons and pints, streamlines and reduces the cost of handling product from freezers, through hardening room to loading, and unloading for delivery.

To eliminate all possibility of off-flavor development due to oxidation, or a metallic flavor which can be produced by some metals, only stainless steel or black iron is used in the vegetable oil system.

Storage tanks are directly connected by lines and meters to the pasteurizer, enabling ingredients to be metered automatically into it.

## Processing

Starting with the weigh tank and scale, the procedure is as follows:

Water from one of two 50,000-gal. Elgin softeners is weighed and run into mixing tank. It is then recirculated through the dry mixer, where all dry ingredients—milk-solids-not-fat, stabilizers, emulsifiers, powdered egg yolk, etc.—are incorporated.

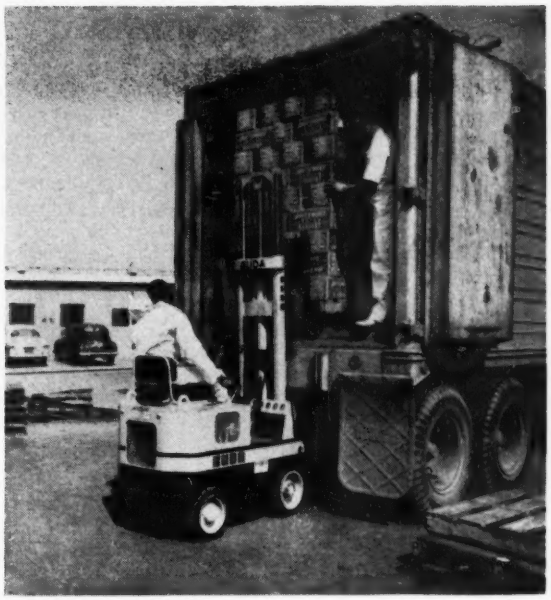
By changing valves of the recirculating system, this homogeneous mixture is pumped to the pasteurizing vat. Here liquid sugar, corn syrup, and vegetable oil are automatically metered to the mix.

## It's All Packaged

Pasteurization is at 165 deg. F. for 15 min., followed by homogenizing—first stage, 1,500 psi., 2nd stage, 500 psi. Homogenized mix flows through the plate cooler, where its temperature is reduced to 38 F., then to one of the two 1,000-gal. refrigerated holding tanks. Mix is then pumped to the continuous freezers that discharge frozen products to one of the two packaging machines.

At present, only three flavors are produced—vanilla, strawberry, and chocolate. Strawberries and vanilla are added to the holding tank before freezing. Chocolate is a special mix in

**3 FROZEN PRODUCTS** are packaged—24 pt. or six ½-gal. —in corrugated paperboard cases. These are sealed, conveyed to hardening room, where they are palletized and handled by fork trucks.



**4 FOR DELIVERY,** pallet loads are moved from hardening room and placed on refrigerated trucks that haul them to warehouses located in many parts of the state. Truck refrigeration units are butane operated.

which the chocolate and cocoa are added before pasteurization.

As pint or half-gallon packages leave filling machines, they are packed into corrugated cartons—24 pt. or six ½-gal. Same size case is used for either ½-gal. or pt. packages.

Flavors, package size, and date are printed on tape that is used to close top flaps of case. Bottom flaps are machine stapled. Sealed cases are then placed on a belt conveyor that moves them to the —30-35 deg. hardening room, where they are manually palletized 50-100 to a pallet. Cases are piled approximately 1 in. apart to provide for air circulation to harden the product in about 16 hr.

### Legal Posers Surmounted

**In mid-June 1953—two months after this plant's production started—the State of California called a halt on sale of vegetable-oil "ice cream" to all retail outlets handling ice cream.**

**The California State Department interpreted the word "place" in the pertinent law (which read "Imitation ice cream cannot be sold in the same *place* ice cream is sold") to mean "under the same roof or in the same building."**

**Frozen Desserts Inc. obtained an injunction in order to continue operations. Then, on Apr. 7, 1954, Judge Alfred L. Bartlett, issued a permanent order stating the law was "discriminatory" and that this product could be sold in all kinds of retail outlets under a license— costing $5 per year.**

**Since clarification of the law, sales volume has been increasing significantly.**

Plant is designed for future expansion. By adding a 500-gal. pasteurizer, and additional plates to the cooling unit, mix-making capacity can be doubled. Space is available for a 3,000-gal. holding tank and two 400-gal. Vogt freezers. Necessary refrigeration lines, electrical outlets, etc., have been previously installed.

### Sanitation System

Equipment cleanup follows a pattern of circulation cleaning wherever feasible. At the end of a day's production, weigh tanks and pasteurizer are hand washed.

Next step follows same pattern as processing. About 800 lb. of rinse water is run into weigh tank, circulated through piping to pasteurizing vat, then pumped through plate cooler and piping leading to the holding tanks. A flexible 1½-in. plastic hose is used to return water from this piping to pasteurizing vat. Circulation of rinse water is continued for approximately 15 min. During this time the cleanup man dismantles the homogenizer, cleans and lubricates it.

After the 15-min. circulation, rinse water is drained from equipment and there is added clean water with a 10% alkyl-dimethyl-benzyl-ammonium chloride solution (to a strength of 220 ppm.) for germicidal action. This solution is circulated for approximately 15 min. There follows an additional 10-min. clear-water rinse.

Holding tanks are hand cleaned in the same manner as weigh and pasteurizing tanks, and piping from them to filling machines is circulation-cleaned. All equipment is dismantled weekly and cleaned and lubricated in the conventional manner.

### Handling Minimized

Pitched, easily drained tile floors aid in rapid and efficient cleaning. Specially designed food-plant paint covers the concrete walls of the processing rooms. In addition there is adequate ventilation throughout the plant. Stress is on manufacture of a clean, wholesome food product.

### Scores Par on Nutrition

**Vegetable-oil frozen dessert's nutritional value is on a par with that of the other table and party favorites.**

**Major deficiency is lack of vitamin A—but this can be incorporated in the finished product. The oil has abundant vitamin E and the more essential fatty acids. It does not contain any of the so-called cholesterols.**

**Oil used by Frozen Desserts Inc. is manufactured to specifications, having a melting point of 95-98 deg. F.**

**Flavoring by other ingredients is extremely important in the vegetable-oil product, since the odorless and tasteless oil carries and magnifies off-flavors. As a general rule, more intense flavoring is needed here.**

**Last analysis of caloric content per pint of FDI's products read: Vanilla 542, chocolate 559, strawberry 564.**

**Stabilizers and emulsifiers likewise are very important. For vegetable oil has a great tendency, during pasteurization, to oil-off and form a heavy film at the top of the mix.**

We have tried to eliminate all unnecessary handling of both raw materials and finished products. Liquid sugars and liquid oil tanks are indispensable, since they not only cut handling but make a substantial saving in the purchase of raw material.

Milk-solids-not-fat, chocolate, cocoa, are all received in 50-lb. containers, a convenient weight that tends to speed up the handling in processing.

Handling a 3-gal. case of packaged products instead of the conventional 1-gal. one results in substantial savings.

An electric-lift fork-truck is used in the hardening room for pallet stacking and for loading large trucks. An additional hand-jack lift-truck is employed for moving merchandise in and out of hardening room. Pallet loads are placed directly on distributor's trucks and unloaded when they reach their destination in the same manner. Subsequently, pallets are returned to the plant. It requires approximately 15 min. to load or unload a truck with 6,000 gal. of product when using these palletized, corrugated cartons.

### Oil Stored Under Gas

The vegetable oil tank is equipped with an 80-gal. automatic electric water-heater that maintains the product temperature continuously at 95-100 deg. F. A tank of nitrogen, controlled by an automatic pressure regulator, maintains a constant blanket of nitrogen over the oil at all times. This is purely a safety factor to eliminate the possibility of oil oxidation during storage.

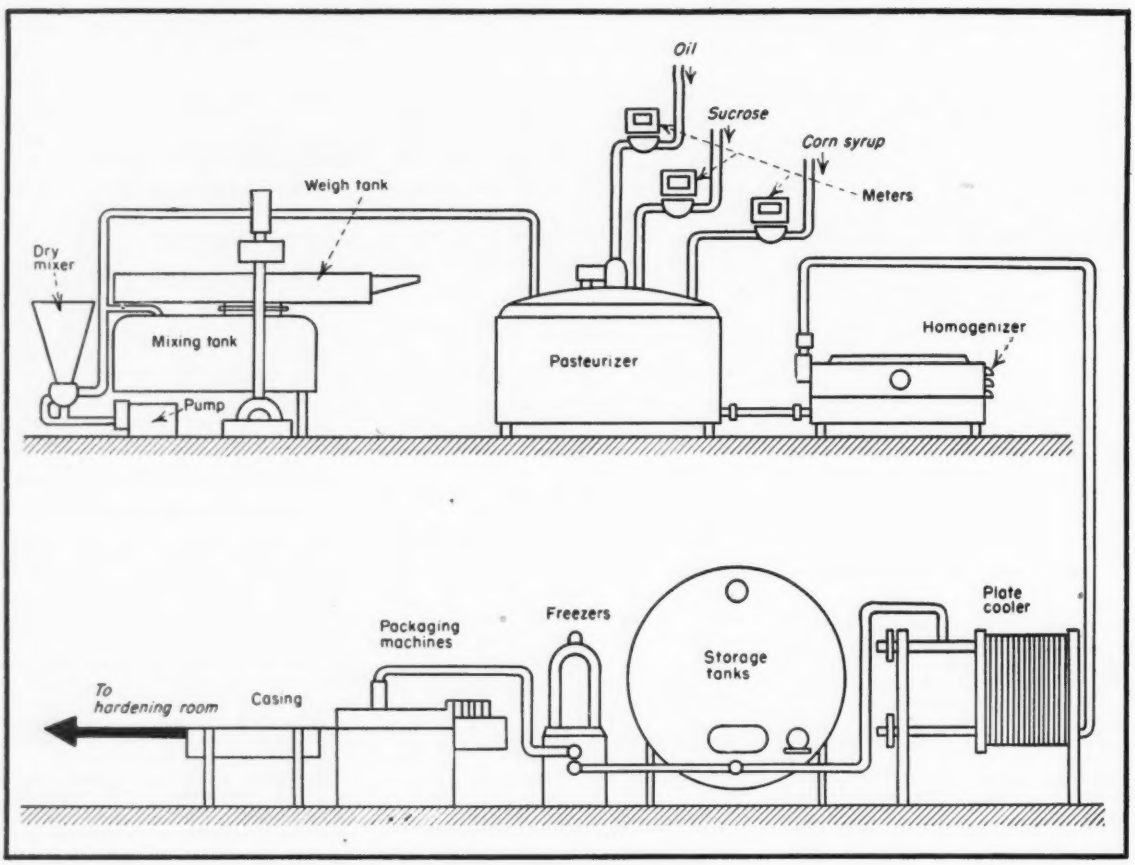
This is strictly a processing plant having no retail sales or distribution facilities.

The products are made and packed for Picsweet Foods, Inc., Jersey Maid Creameries, and Arden, each furnishing its own cartons and cases printed with brand name. These companies pick up the merchandise at the plant and warehouse it at their point of distribution.

Arden and Jersey Maid distribute in the Los Angeles area. Picsweet throughout the state of California. Large, insulated reefer vans refrigerated with units operated by butane are used for hauling to San Francisco. Each of these has a capacity of 6,500-7,000 gal. and maintains a temperature of −10 to 15 deg. F. during the 12-hr. haul.

## Process Line for Vegetable-Oil "Ice Cream"

### Features Standard Dairy Equipment




### Brief of Equipment

**FDI's complement of process units includes: A 1,000-lb. weigh tank; a 2,000-lb. mixing tank; a dry mixer; 500-gal. pasteurizing vat equipped with special agitator to handle vegetable oil; 1,000-gal./hr. Superhomo homogenizer; 1,000-gal./hr. Superplate cooler; two 1,000-gal. holding tanks with inlet at bottom to eliminate foaming; two 400-gal./hr. Vogt continuous freezers. This line-up of equipment (supplied by Cherry-Burrell Corp.) is supplemented by an Anderson ½-gal. (1,100-gal./hr.) package filling machine; an Anderson double-line automatic pint filler (800 gal./hr.); a 55,000-lb. liquid sucrose tank; a 30,000-lb. liquid corn syrup tank; 30,000-lb. vegetable oil tank.**

**ONE-CUP BAGS** feature extra-volume tucks. Dunking strip is of same material as bag.

**IT'S** 20 servings to each custom-packed glass jar, with screw-cap closure under vac.

# Individual Servings *At 200-Plus a Minute*

Beverage packer's machine forms bags . . . fills with ground coffee or tea to close weight . . . heat seals . . . then snips off units at high speed

**FE STAFF**

Versatility is outstanding in the packaging machine that has been developed by Modern Coffee Co., Boston, for high speed forming, filling, and closing heat-sealable bags.

This equipment can be adapted to form a wide range of package sizes and shapes and to fill with many different types and weights of dry materials in the speed range of 200 bags per min.

At present a battery of these units is employed at Modern Coffee's plant to custom-package single-serving coffee and tea bags.

Finished tea bags are carton packed. Coffee bags are inserted, 20 to the container, in vacuum sealed screw-cap-closed glass jars.

### Machine and Its Operation

The compact unit is simple both in number of parts and structural design. Roasted coffee (usually supplied by customer) is ground at the plant and immediately transferred in controlled amount to the filler hopper of the bagging machine.

Discharged from the hopper, coffee enters into one of four recessed cup-shaped chambers in a cam-rod-rotated cylinder turning on a horizontal shaft.

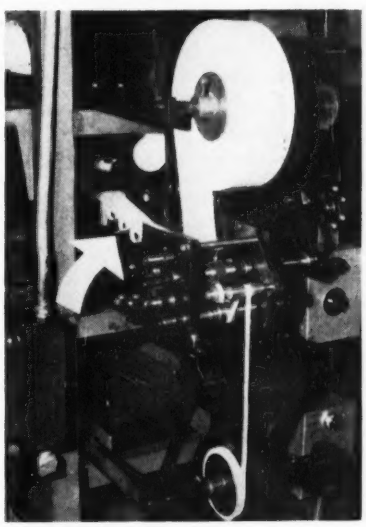
Capacity of each chamber can be varied both to obtain and maintain weight and accuracy (tolerance of 1% or less). Adjustment may be for a single chamber or for all four simultaneously. Here manipulation of a wheel at the side of the machine uniformly raises or lowers, with a chucklike movement, the floor or bottom of all of the chambers—or a sensitive screw arrangement may be employed for varying volume of an individual chamber.

This latter adjustment, which is made to bring proportioning recesses to weight agreement, must be made when the machine is stopped. On the other hand, the simultaneous volume change of all chambers may be made while the machine is in operation.

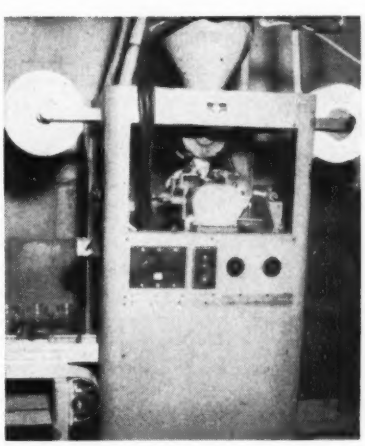
### Bag Aspects

Heat sealable to a strong bond is the odorless, tasteless rayon and Vin-

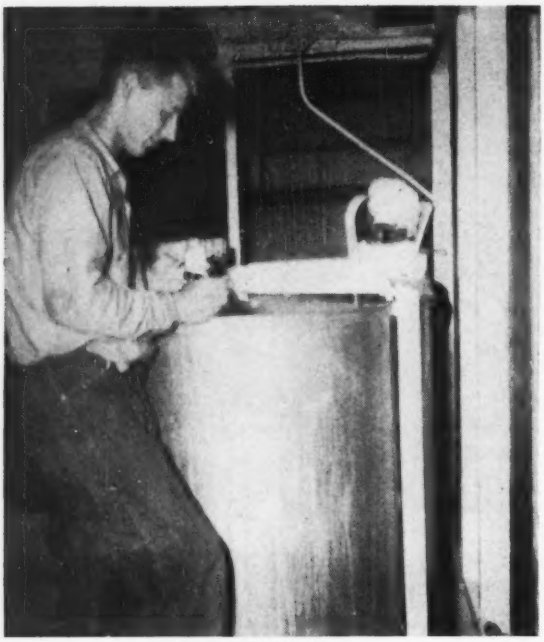
(*Turn to page* 144)



**DUNKING STRIP** is heat sealed to package material in loops (arrow) as containers are formed.



**MACHINE** is simple, compact, sturdy. Two rolls supply package material to unit.



**Put in brine . . .**

Enzyme goes in brine make-up tank in teaspoon quantities. Treatment costs less than ¼¢ per pound of peas.

**. . . that's fed to filler . . .**

This brine fills can headspace and space between peas. Enzyme does work in half hour prior to retorting.

# . . . Enzyme Acts as Tenderizer

Vine-ripe quality restored to peas when Midwest cannery applies enzyme preparation . . . Similar benefits seen with starchy fruits and vegetables

**H. E. BODE**

President, Bode-Lowry & Associates, Chicago

One of the major problems facing canners of field crops is timing harvest and pack for optimum ripeness. This is particularly acute with peas, which rapidly develop tough starchy constituents after reaching peak quality.

From parallel work with some of the new industrial enzymes, it occurred to the writer that perhaps there could be added to peas, at some stage of canning, a preparation that would retard, even reduce, this starch "toughening".

Facing the quality problem in his sizable pea havesting and canning operations, J. P. Kraemer, president, Mammoth Springs Canning Co., Sussex, Wis., agreed, three seasons ago, to explore possibilities of this idea. Accordingly, several enzyme blends were developed and tested by adding in the canning brine. And later, taste panels were set up to evaluate results.

After three test packs and some basic improvement in the preparation and the method of addition, two intriguing gains appear obvious:

**1. A general increase in pea tenderness—through enzymic modification of highly polymerized starch to simpler, thinner forms.**

**2. A very noticeable improvement in sweetness and flavor—due to partial conversion of starch to dextrin and maltose.**

With these promising results behind us, plans are on foot for further evaluation of the method during the forthcoming 1954 pack before attempting to broaden and establish it commercially. However, patent application has been filed.

## Not Simple Operation

While the idea itself seems disarmingly simple, development of the right enzyme combination and method of application has involved a considerable amount of "know-how."

For one thing, most starch-modifying enzymes are heat sensitive and would be destroyed at normal brining temperatures. It remained for Takamine Laboratory to offer its heat-resistant enzyme to solve this problem. This retains its potency at temperatures up to 200 deg. F., but it will be only partially effective up to its complete destruction at 212 deg.

Another problem concerned time of action. Naturally, a standing period would be needed after brining, for immediate pressure-retorting would destroy the enzyme. At first about 1½ hr. standing-time for filled cans was demed advisable, but changes in the preparation and an increase in its potency have decreased this to ½ hr.—a period that can be easily integrated into normal cannery flow.

But by far the biggest problem was the matter of securing the right enzymic balance and conditions to accomplish the job without adversely affecting the natural flavor of peas.

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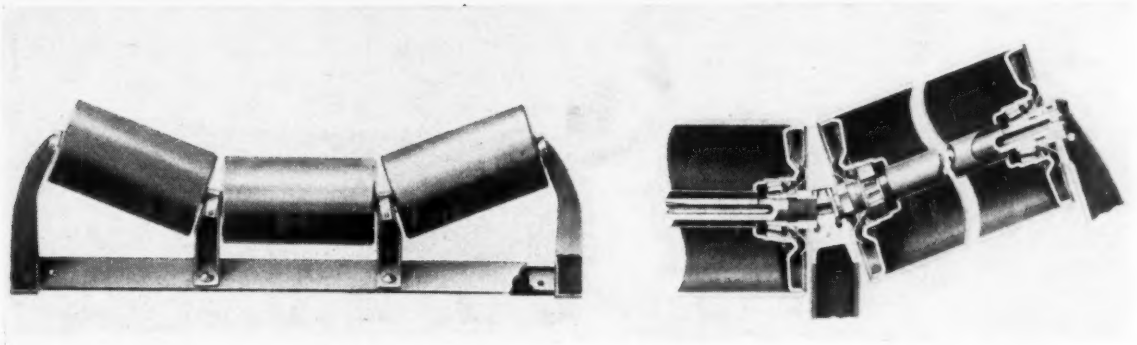
# NEW EQUIPMENT & SUPPLIES



## Belt Idlers' Seals Keep Dirt Out, Lubricant In

Dual flexible contact seals highlight the new MD and HD Series belt idlers.

New seals perform double function of keeping out dirt and retaining grease, for practically an endless period of time. Since idler is factory packed, adjusted and sealed, this creates a permanently lubricated idler.

As an added feature, design permits re-greasing from either end when and if desirable through shaft, grease reservoir and new "Neoprene" shaft connectors.

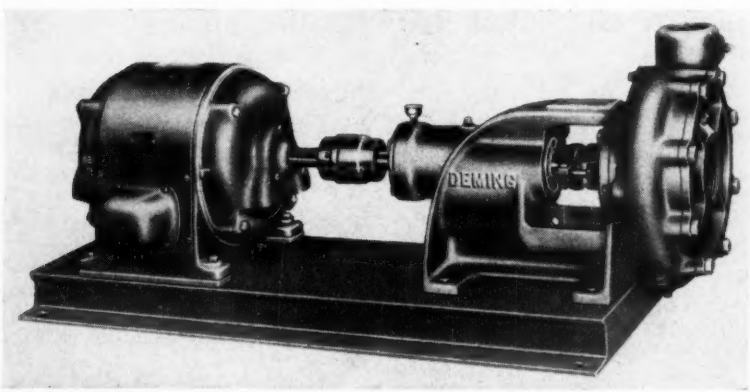
Idler also provides for easy roll removal without loosening or removing stands. Rolls are held in place during shipment and operation by means of straps on center and end stands. Fine threading provides minute bearing adjustment. The locked-in type construction, through grooved adjusting nuts, provides a rugged, truss-type construction to assembly.

Extra heavy, electric-welded steel pipe of full and uniform thickness from end to end, form belt carrying rolls, which are machine beveled on ends to protect belt and workmen. Formed steel roll ends are pressed and welded into pipe shells effecting maximum strength and true running.

**Circle 95A on Reader Service Card**

Series features the 2 deg. tilted ends stands for engineered belt training. This tilt in direction of belt travel tends to give center roll of troughing idler more control over belt.

Additional features are self-cleaning inverted angle base, die straightened malleable iron stands, mounting feet cast integrally with end stands, high-capacity tapered roller bearings, outer shields giving extra protection to double flexible seals, vented rolls for pressure balance, and plugs to prevent promiscuous greasing.—*Jeffrey Mfg. Co., 956 N. Fourth Ave., Columbus, Ohio.*




## Centrifugal Pump Is Easy to Service, Maintain

This new end suction centrifugal pump is offered with optional features for specific needs.

Identified as 4011 Series, sizes range from 1 to 5 in. discharge; capacities up to 1,000 gpm., maximum heads up to 250 ft. Units can be furnished with electric motor, for belt drive, or pump.

Semi-open, non-clogging type impeller has extra heavy, 3-vane construction for exceptional wear resistance in all types of service. Axial shaft adjustment which can be made while pump is running permits regulation of capacity and head, and adjustment for impeller wear.

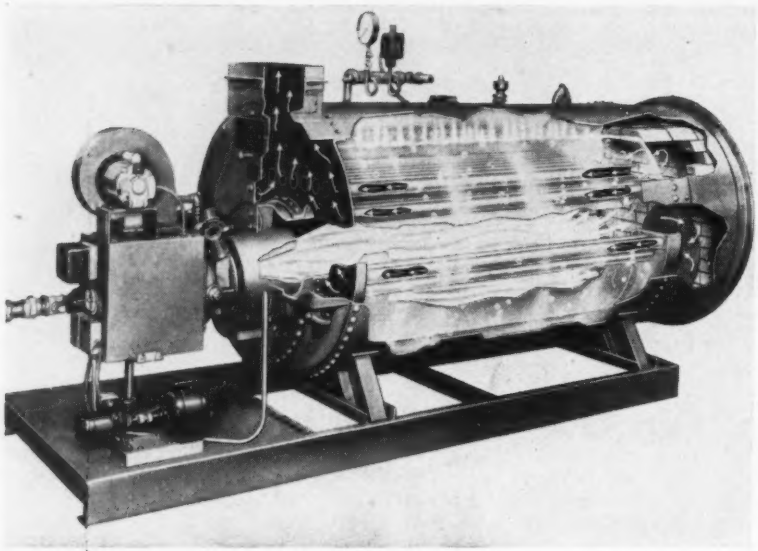
For handling liquids with lime, chips, and such solids which tend to coat metal surfaces, or clog space between impeller and casing, an impeller with wiping vanes on back can be furnished.

The four-piece, separate liquid end assembly permits easy service and maintenance. Liquid end is standard iron construction but can be furnished in proper corrosion-resistant metals for special requirements without necessity of changing standard iron construction of power end.

Standard equipment provides for stuffing box construction with lubrication by grease or clear water in lantern ring. For abrasive or corrosive service, a pressurized clear water connection to lantern ring is recommended. A flushing type stuffing box construction is termed ideal for shaft cooling or high vacuum sealing.

Where required, a mechanical seal construction of double-seal design with pressurized water or grease lubrication is furnished but only with stainless steel shaft. This construction gives trouble-free service with all types of non-corrosive liquids. Special seal materials are available for use with most types of corrosive liquids. Any type and manufacture of mechanical seal can be installed.—*Deming Co., Salem, Ohio.*

**Circle 95B on Reader Service Card**



## Package Type Boiler Is Easily Installed

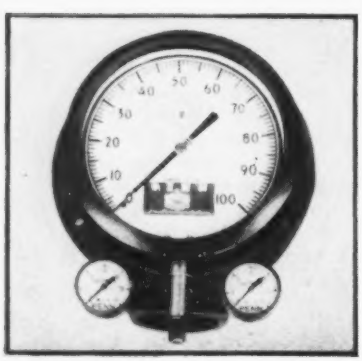
This new, self-contained, fully automatic scotch-marine boiler is reported capable of producing 125 hp. maximum rating, without pushing or "strain."

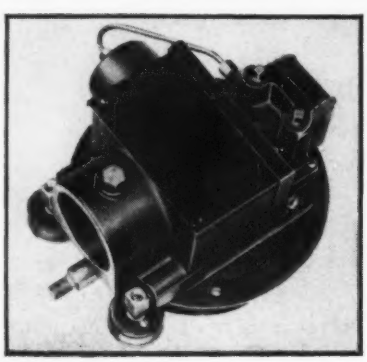
Design and construction meets all requirements ASME Code. Equipment includes boiler shell, with extra-large furnace, mounted on a rigid steel platform, flue gas collector, burner, air blower with direct connected motor, motorized gas valve and/or oil solenoid valve, air and fuel ratio adjustor, gas pressure regulator or zero gas governor, gas cocks, gas pilot with solenoid valve and spark ignitor, ignition transformer, low water fuel cut-off with water level control switch, electronic flame failure protection, pressure switch, water column, pop safety valve, steam gage, try cocks and water gage.

Completely assembled, new boiler is ready for immediate operation after electricity, steam, water, fuel and stack are connected. All necessary wiring is complete.

Special features according to maker are its larger than average steam space, combustion area, water storage area, and heating surface.—*Eclipse Fuel Engineering Co., 1002 Buchanan St., Rockford, Ill.*

**Circle 96A on Reader Service Card**



## Compact Instrument Has Dual Features

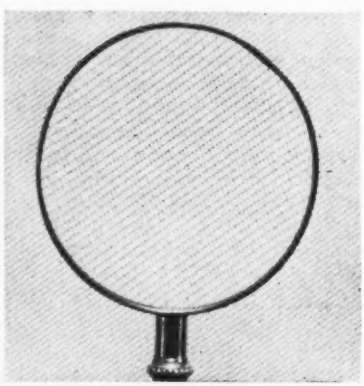
This new unit combines the direct indicating features of a pressure gage with pneumatic transmission for remote indicating, recording or controling of pressures. Suitable for outdoor, unprotected installation, it is extremely rugged and compact and may be mounted either on a 2 in. pipe pedestal, wall or panel.

Output pressure of transmitter varies from 3 to 15 lb. (or 5 to 25 lb. if specified) regardless of range of pressure being measured. Ranges from vacuum to 10,000 psig. are regularly available.

The gages used are made in either 6 or 8½ in. sizes with Buedon tubes of a wide variety of materials such as bronze, beryllium copper, carbon steel, stainless steel, nickel or Monel.

Highest accuracy is achieved as instrument is calibrated with comparison of actual pressure applied to gage versus transmitted air. Process control is safely achieved by using these pressure transmitters with pneumatic receiver controllers either of full case recording type, miniature graphic panel type or non-indicating type. Distances up to 1,000 ft. are practical for remote indication or recording; up to 400 ft. for control.—*Penn Industrial Instrument Corp., 4110 Haverford Ave., Philadelphia 4.*

**Circle 96B on Reader Service Card**



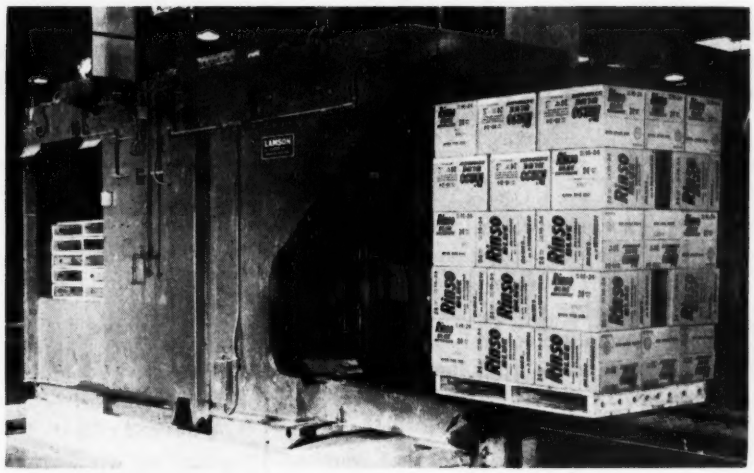
## Polyethylene Fabric Used As Filtering Media

Recommended for free-filtering applications such as coarse crystalline materials or fibrous pulps is a new fabric of polyethylene.

Woven of polyethylene monofilaments, new cloth has a relatively open mesh, somewhat similar to fine wire cloth. Material is reported to have high filtering efficiency, and does not blind or plug up in continuous operation. Its smooth filaments permit easy cleaning.

Chemical resistance gives fabric long life. It resists alkalis as well as inorganic acids, and at room temperature is also resistant to many organic chemicals. It is odorless, tasteless, and nontoxic. Cloth is tough, abrasion-resistant, and has excellent flexing properties even at sub-zero temperatures. —*Filtration Engineers, Inc., 155 Oraton St., Newark 4.*

**Circle 96C on Reader Service Card**



## Side Pallet Magazine Ups Handling Unit's Versatility

Pallets up to 48 in. wide can be handled by this new automatic palletizer built with a side pallet magazine.

This new feature makes possible the placing of two-way pallets in the magazine with their pick-up opening facing the side. Previously, pallet openings had to face the rear of the machine in order to be stacked in the rear pallet magazine.

Availability of rear and either left or right side storage magazine enables systems to be engineered around physival facilities of prospective plant. Loaders can now be placed in positions formerly inconvenient.

Designed to load pallets automatically in mass production operations, cartons or cases are conveyed from sealing machines to top of loader, where electro-mechanical devices position and stack them onto pallets. Machine is designed to handle various size cartons and automatically changes pallet patterns in a matter of seconds for approporiate carton. Pallet magazine automatically supplies pallets as preceeding loads are completed and ejected from machine. Cartons can be stacked at a rate of 15,000 cases per 8 hr. shift, palletizing the output of from one to three filling lines.—*Lamson Corp., Syracuse, N. Y.*

**Circle 97A on Reader Service Card**

## Power Driven "Y" Avoids Conveyor "Jam-ups"

Clogging and "jam-ups" on converging lines are eliminated with a new compact, power driven "Y" roller conveyor unit.

Assembly consists of a power driven 90 deg. roller conveyor curve and a 5 ft. long, live straight roller section, both of which are chain driven by a single ½ hp. gearhead motor through universal joints. Offering speeds up to 90 fpm. the "Y" can be incorporated into all types of package conveyor lines, whether on floor or suspended from ceiling.

A plastic guard on either side of unit permits maintenance men to observe moving parts and protects operators from having their clothes caught in chains and sprockets. Upkeep on unit is low—*Harry J. Ferguson Co., Jenkintown, Pa.*

**Circle 97B on Reader Service Card**

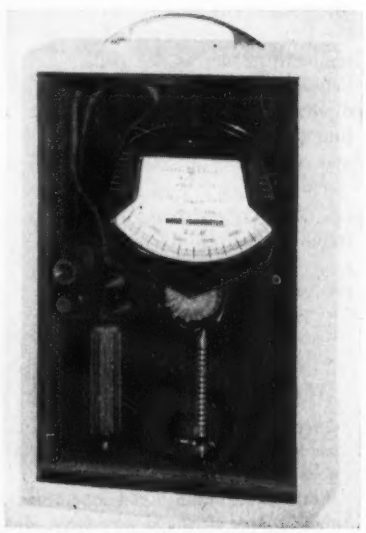
## New Separator, Clarifier For Smaller Dairies

Of interest to smaller dairies, plants processing 800 to 1,500 gal. of milk a day, is this new separator, clarifier and standardizer for both cold and hot milk.

Designated the RF-10 MP, operation of this multi-purpose machine can be changed quickly from standardizing-clarifying to separating and back without stopping nor disassembling. All operations are controlled by adjustment of two externally controlled valves.

Unit features a parallel drive, which has no gears and requires no lubrication, plus capacity ratings up to 4,500 lb. of milk per hr. Excess cream is simultaneously standardized as milk is clarified and standardized. If desired, unit can be furnished as a separator-clarifier, with provision to add standardizer later.—*Sharples Corp. Dairy Equipment Div., 2300 Westmoreland St., Philadelphia 40.*

**Circle 97C on Reader Service Card**



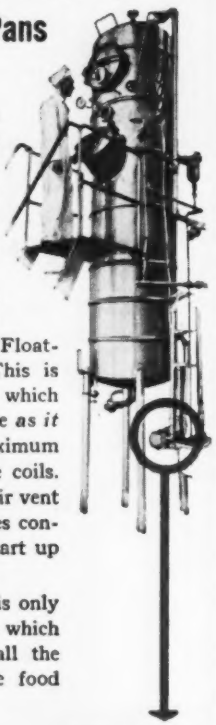
## Hand Tachometer Device Minimizes Misreadings

This new, portable hand tachometer features a scale-changing device which reduces misreading of its various ranges.

Three different models, each having three ranges, are capable of measuring rotational speeds from 2 to 100,000 rpm. and linear speeds from 2 to 10,000 fpm. with accessories. Accuracy is plus or minus 1% of full scale under all conditions, according to maker's engineers.

# Misused steam plays havoc with production schedules and costs

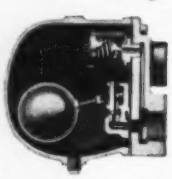
## Mojonnier Plays Safe— Installs Sarco FT Traps On Its Vacuum Pans



The Mojonnier Vacuum Pan is used to condense liquid foods. To obtain maximum heat transfer, steam coils must be kept free of condensate, air and gases.

Mojonnier assures the efficiency of its vacuum pans by installing Sarco Float-Thermostatic Traps. This is the only type of trap which discharges condensate *as it forms* thus assuring maximum temperature across the coils. Built-in thermostatic air vent discharges air and gases continuously – both at start up and *during* operation.

The Sarco FT Trap is only *one of 5 different types* which Sarco makes to fill all the trapping needs of the food processing industry.



**Sarco Float-Thermostatic Trap**

Offers instant removal of condensate plus continuous operation without shock or disturbance of temperature. Available in large sizes and very large capacities.

**Use Steam Right**

1. To prevent production delays
2. To improve product quality
3. To maintain desired output
4. To reduce labor and steam costs

IN YOUR processing operations, are you up against troubles such as slow-ups, uneven or inadequate heating, poor temperature control—resulting in reduced output, lowered product quality and increased costs?

You may suspect that your equipment is at fault. But process heating headaches often are due to ineffective utilization of steam. The wrong type trap can cause condensate to waterlog equipment. Improper air-venting can reduce the rate of heat transfer by as much as 11%. Manual temperature control may prove erratic, affect product quality, increase production costs.

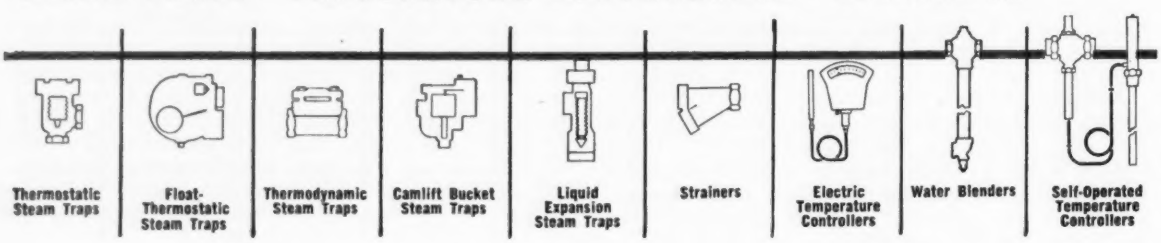
If your plant is suffering from any of these production handicaps, Sarco can help you. Sarco has a wealth of practical experience in the process industries to put to work for you. Plant after plant, with Sarco help, has licked these problems through simple, inexpensive changes. The results have been: increased output, improved product quality uniformly maintained, lower production costs.

**Engineering Service:** Our engineering service is yours for the asking. Call our local representative, or, write today for case histories describing how other plants in your field have solved similar problems through the proper application of steam traps and inexpensive temperature controls. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

# SARCO

*improves product quality and output*

*STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS*



Applications of tachometer include speed measurement of motors, generators, turbines, conveyor belts.

Equipment consists of two basic units: A head, which is placed against moving object; and an indicator, which is attached by a 2 ft. flexible electric cable.

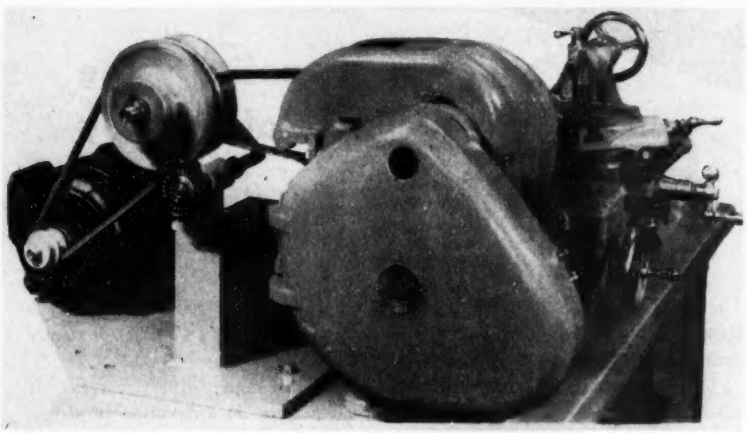
Head unit includes a rotating shaft which operates a set of contacts through a positive cam mechanism. Weighing only 6 oz., it is small enough to be placed in contact with rotating shafts or moving objects where little space is available.

Indicating unit incorporates a reactance circuit, a multi-scaled milliameter, and a flashlight-cell power supply. Battery life is about 2 to 3 yr. Changes in voltage may be compensated by a self-contained calibration circuit.

Accessories include two external cone tips, an internal cone tip a 0.1 ft. disk, a 1 ft. disk, a low-speed adapter, a high-speed adapter, and an extension arm, all stored in a compact carrying case along with the tachometer.

Equipment has a total weight of 3¾ lb. including carrying case, which measures 11 $\frac{7}{16}$ x 7 $\frac{5}{16}$ x 3¾ in.—*General Electric Co., Schenectady 5, N. Y.*

**Circle 97D on Reader Service Card**

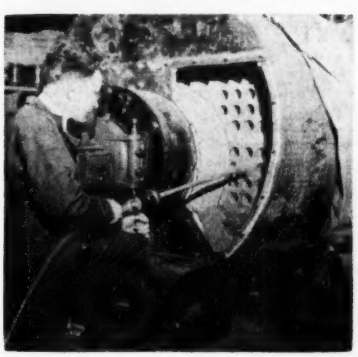


## Drive's Capacity High, Speed Range Wide

This new variable speed drive is of countershaft type which varies speed by changing its location between two fixed sheaves. Feature of drive is spring loaded belt face which maintains correct belt tension in all speed positions. Design assures full load carrying capacity throughout full speed range of 9 to 1. Standard V-belts are used in both the 4 in. ¾ hp. and the 6 in. 1½ hp. standard sizes.

Covenient hand control is located away from belts and other moving parts for greater safety. Control adjusts speed by swinging countershaft in an arc around its base. It also moves sheave positively along its axis to maintain belt alignment in both horizontal and vertical shaft applications of the compact machine.—*Speed Selector, Inc., 118-U Noble Court, Cleveland 13.*

**Circle 99A on Reader Service Card**



## Percussion Lance Spurts Boiler Tube Cleaning

Speed and economy in the removal of combustion deposits from boiler tubes is reported with use of percussion lance.

Unit, light in weight (5½ lb.) may be operated from any position and provides, by conversion from compressed air or steam, the steady potential energy of a compressed fluid into a kinetic force pulsating 1,500 times a minute on the surface to be cleaned.

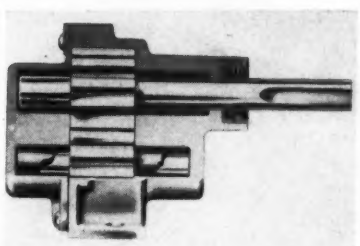
The amount of air or steam required to operate the lance is:—Minimum 20 cfm. at 100 psi. or 110 lb. of steam per hr. at 105 psi.

New tool eliminates slow laborious work with brushes and scrapers when cleaning soot, ash or clinker from the tube surfaces in flame or water tube boilers, economizers and air preheaters. Lance has few moving parts and in normal usage an annual overhaul with a re-bore job is all that is required in the way of maintenance.

In case of flame tube boilers, even under adverse conditions, tubes may be cleaned by inseting lance six inches into each tube when by simple trigger action three or four bursts will effectively clean the entire inner surface.

Lance is steady in action and is so designed that it automatically switches off air when plunger is released by the operator thus resulting in no wastage of compressed air. Lance will thoroughly clean a 300-tube waste heat boiler in thirty minutes. Soot, clinker and most kinds of nesting which occur on the fire side of water tube boilers can be cleared by the high-frequency shock action of the blasts often without having to put the boiler out of action, thus increasing boiler availability.—*C. F. Carpenter, P. O. Box 87, Allentown, Pa.*

**Circle 99B on Reader Service Card**



## Gear-Type Pump Handles Heavy, Light Liquids

Light liquids can be handled by this new gear-type pump at speeds up to 1,725 rpm. Heavy liquids such as molasses, heavy oils, chocolate syrup, can be handled at slower speeds.

Construction of pump permits pressures up to 100 psi. It can be operated in either direction of rotation with capacities and characteristics same in both.

Simple construction combined with precision manufacturing are said to assure long life with minimum servicing. Pump has mechanical seals which require no adjustment. Carbon bearings, tough bronze alloy gears and case, and micro finish stainless steel

## will now benefit by the outstanding facilities offered by

# "PACKAGE"

The acquisition of the Transparent Wrap Machine Corporation marks a significant development in Package Machinery Company's 41 years of steady growth and progress.

The addition of Transwrap machines to the many different types of machines built by "Package" results in a line that is unrivalled in scope. Moreover, package goods manufacturers can now benefit by the combined ingenuity and experience of the top-ranking technical personnel of both organizations.

Transwrap machines have established a splendid record throughout the packaging field—for versatility, dependability and economy. The various models developed cover a wide range of products. They automatically weigh, fill and seal liquids or solids into transparent bags or sandwich-type envelopes which are simultaneously made by the machine from roll stock. The machines are supplied with various types of feed and each machine is CUSTOM BUILT to the user's particular needs.

We take pride in adding these unique machines to our line and assure all Transwrap users of our utmost cooperation. We want you to obtain the greatest benefit from this fine equipment.

*Write us for complete information or assistance on any packaging problem.*

PACKAGE MACHINERY COMPANY • Springfield, Massachusetts

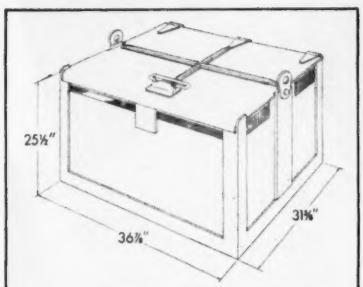
NEW YORK PHILADELPHIA BOSTON CLEVELAND CHICAGO ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

PACKAGE
MACHINERY COMPANY

shaft are other features claimed for the unit.

Pump is available as a complete unit with pump, base, coupling and motor; as complete assembly less motor; or as a replacement with pump only.—*Eclipse Fuel Engineering Co., Rockford, Illinois.*

Circle 99C on Reader Service Card




Dimensions of 30-cell MC 8 assembled in demountable steel box, capacity, 20.52 kwhr.

## Electrical Truck Battery Has High Capacity

Maximum capacity for its size is claimed for a new type of storage battery now offered for use with electrical industrial trucks.

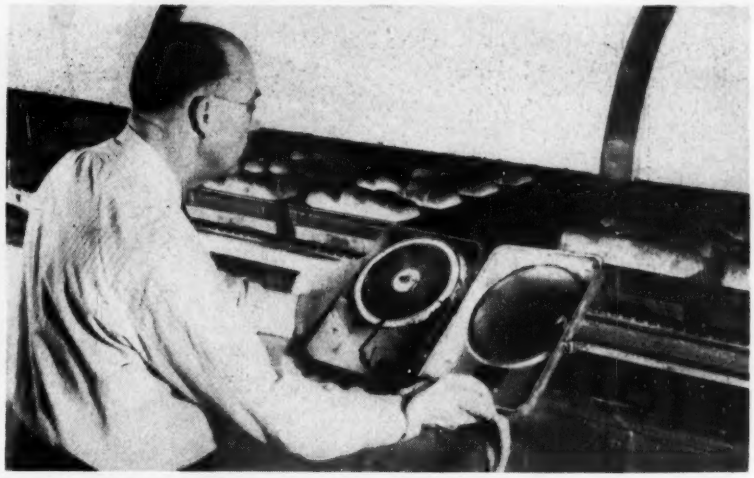
Designated the MC type, it has been developed for use in electric industrial trucks in which space available for battery is limited, especially trucks of the driver-ride, sit-down type.

New battery is stated to afford a means of supplying most trucks of this type with as much as 25% more capacity without changing either steering-wheel or pedal heights and without increasing either length or width of battery boxes.

Cells of battery employ the standard steel-tube and pocket construction of plates which is among the major reasons for durability and long life. They are rated at the normal 5-hr. discharge rate, can be charged at full normal rate, and withstand various electrical "accidents" in the same manner as other maker's cells.

Initially, cell is being produced in six sizes, MC4, 5, 6, 7, 8 and 10 with capacities ranging from 285 amp. hr. for MC4 to 710 for MC10. Standard assemblies range from 10-cell MC4, rated capacity 3.42 kwhr. to 42-cell MC10, rated capacity 35.78 kwhr.—*Thomas A. Edison Inc., Edison Storage Battery Div., West Orange, N. J.*

Circle 101A on Reader Service Card



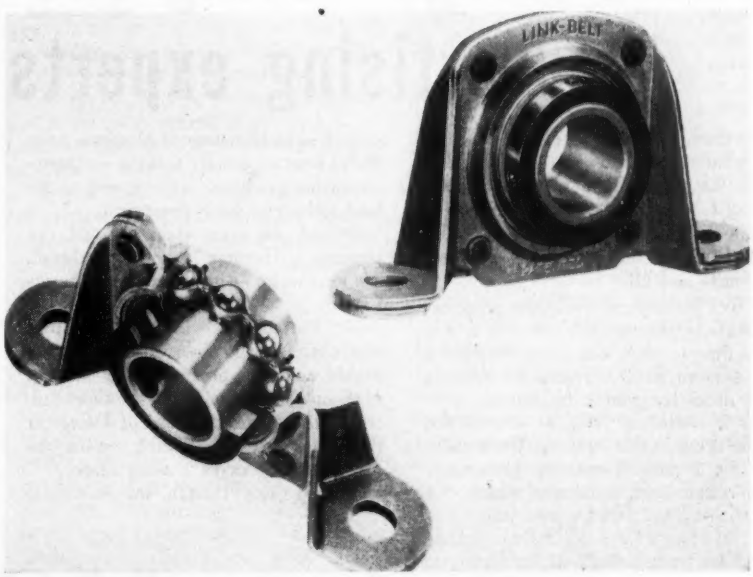
## Recording Thermometer Passes Through Oven

Of interest to bakers and bakery maintenance personnel is a new recording thermometer, that passes through the traveling oven with bread and other baked goods.

Instrument, completely self contained, is no higher than a loaf of bread. In operating position, unit is simply placed on its back next to a pan of baked goods and allowed to pass through traveling oven. When it emerges at discharge end, a complete record of actual temperatures encountered at each point along way are inscribed on its chart.

With this information, operators are in a position to make necessary oven adjustments or repairs to assure uniform bakery products.—*The Bristol Co., Waterbury 20, Conn.*

Circle 101B on Reader Service Card




## New Pillow Blocks for Light Duty Applications

Economies can be effected in light duty applications—where speeds are relatively low, and loads are light—through use of these new ball bearing pillow blocks with pressed steel housings.

A precision deep-groove single row ball bearing, self-aligning in all directions, assures smooth operation and long life. Free-rolling action and full load capacity are maintained even with minor shaft deflection or normal mis-

# Here we go--doing two things advertising experts frown on!

We thought we'd never run a picture of our plants in an ad.

Not us. Generally, we're too busy telling food processors what wonderful things Huron MSG and HVP can do for *their* products. But here it is — factory, chimneys and all.

Why? Because, as the oldest producer of MSG in this country, we felt it was high time to show our users we have a big modern plant, capable of meeting their needs for protein derivatives.

As a matter of fact, we started the whole thing in this country. We worked out the means of making glutamates from wholesome, nutritious wheat, the richest natural source of glutamic acid. We've kept on quietly making our taste-improving products; we've grown as the food industries have prospered.

Second, we never thought we'd run pictures of Huron's "founding fathers". Yet here we go — meet Huron's A. Jarvis Patten.

Mr. Patten is the distinguished protein chemist who first worked out the highly complex procedure for making MSG on a commercial scale in this country. If there's ever a Hall of Fame for the food industries, we think you'll agree Mr. Patten deserves a niche there.

A third thing, though, we can't *show* here. That's Huron's wealth of technical experience. Through the years we've built up a technical service group second to none. Having longer experience than any other manufacturer of MSG, we've amassed a vast fund of technical data on its use. The answers to most of the questions processors want to know are in our files right now.

For MSG that's consistently top-quality, made by the American pioneers in protein derivatives, for practical, usable technical information on how you can improve your products with them, look first to Huron. Huron Milling Company, 9 Park Place, New York 7, N.Y.

## *Huron* MSG

**PURE MONOSODIUM GLUTAMATE 99+%**

**Made by the pioneers in protein derivatives**

**FACTORIES: Harbor Beach, Michigan**

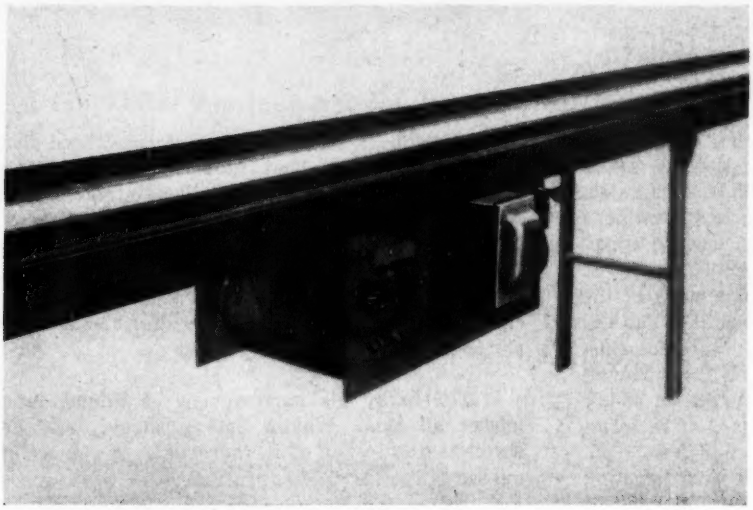
**SALES OFFICES: 161 E. Grand Avenue, Chicago 11 • 13 E. Eighth Street, Cincinnati 2 • 383 Brannan Street, San Francisco 7**

alignment. A long inner ring distributes the load evenly over a large area.

New pillow blocks are available for shafts from $\frac{5}{8}$ to $1\frac{1}{4}$ in. dia. They are easily installed by slipping inner ring onto a shaft and locking it into position. Slotted bolt holes permit easy lateral adjustment.

A synthetic rubber lip-type seal, integral with the bearing, provides maximum sealing efficiency to retain lubricant, and to exclude dirt—even in dusty and dirty locations. No further lubrication is necessary; bearings are lubricated for life.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

**Circle 101C on Reader Service Card**



## Belt Conveyor Has Formed Box-Type Frames

This new belt conveyor, the Speedtable, can be easily and quickly assembled in the field. Rigid sturdy supports bolt sections together. This construction gives the unit flexibility and mobility inside the plant for it can be easily disassembled and moved for different duties.

New carrier has formed box-type frames which are smoothly rounded and enclose the conveyor. It can be ordered in any length. Power unit can be placed in any section of the belt conveyor line, offering added flexibility. Conveyors are available in 10 through 20 in. wide belting, in canvas, oil resistant neoprene or rough top, or with sliders or roller bed, to reduce conveying friction.

Units come equipped with motors of suitable horsepower to meet requirements in the field.—*Speedways Conveyors, Inc., 202 Rhode Island St., Buffalo 13.*

**Circle 103A on Reader Service Card**

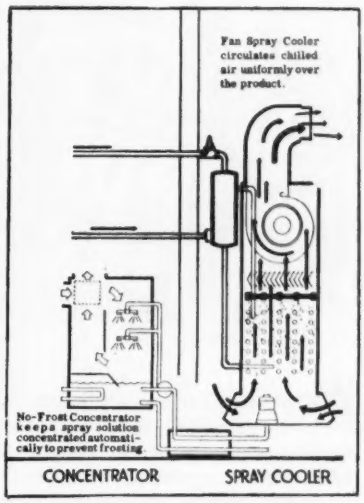
## Industrial Vacuum Cleaner Has Dual Hose Capacity

Two 50 ft., $1\frac{1}{2}$ in. dia. hoses can be operated simultaneously with this new 5 hp. portable vacuum cleaner.

Unit has a large dust bucket and is equipped with an exhauster and motor which produce 6.5 in. hg. suction. New machine is recommended for use as a general housekeeping tool to keep floors, walls, lights and other dust catchers clean.

Compact and maneuverable, it turns easily within its own length. Dynamically and statistically balanced impellers in exhauster minimizes machine vibration and noise.—*U. S. Hoffman Machinery Corp., 105 Fourth Ave., New York City.*

**Circle 103B on Reader Service Card**


Fan Spray Cooler circulates chilled air uniformly over the product.
No-Frost Concentrator keeps spray solution concentrated automatically to prevent frosting.
CONCENTRATOR
SPRAY COOLER

## Cuts Defrosting Trouble In Hardening Room

Elimination of defrosting trouble and expense in the operation of ice cream hardening rooms at low temperatures is reported with use of a new No-Frost system. Fan spray coolers are used to chill and distribute air at minus 15 or minus 20 deg. F.

A new type of liquid concentrator disposes of the moisture that normally results in icing of cooling coils. Cooler, located in hardening room, circulates air at required temperature, keeping room conditions constant because there is never any interruption for defrosting. Moisture is kept from freezing by action of the liquid spray.

As moisture accumulates (and dilutes the No-Frost solution) the liquid is pumped to concentrator which is located outside the room. Here moisture is evaporated and dissipated out-of-doors. New model concentrator, designated as Type A, operates on a completely different principal from older models.

Solution is no longer raised above boiling point of water. Liquid is warmed, then sprayed in an air stream at low speed (induced by the sprays) and then cooled in an air-to-air heat exchanger which condenses the No-Frost liquid and separates it from the moisture laden air. Concentrate is then returned to the cooling system for another cycle.

Equipment is manufactured in a range of capacities adaptable to hardening rooms of any size. By holding temperatures uniform it helps control product quality.—*Niagara Blower Co., 405 Lexington Ave., New York City 17.*

**Circle 103C on Reader Service Card**

# Waldin Smugg IS ASKING FOR A Barrel of Trouble

WALDIN SMUGG doesn't know this, but with better *materials handling* (and worker education) ⅓ of all worker accidents in food plants could be eliminated. And this saving would be in addition to the millions of dollars food plants could save just by moving things faster!

But Waldin Smugg never hears about many of the new wrinkles in food-plant materials handling. You see, he makes a product called foodle. It's different than other food products (just as yours is). So Smugg thinks all the *foodle* progress takes place in *foodle* plants. *He* doesn't read about *other* kinds of factories . . . why should he?

Well, the fact is a new lift truck or bulk handling system may pop up in one kind of food plant and be applicable in others. Happens all the time.* Smugg's competitors know this. They have the jump on Smugg. They read FOOD ENGINEERING.

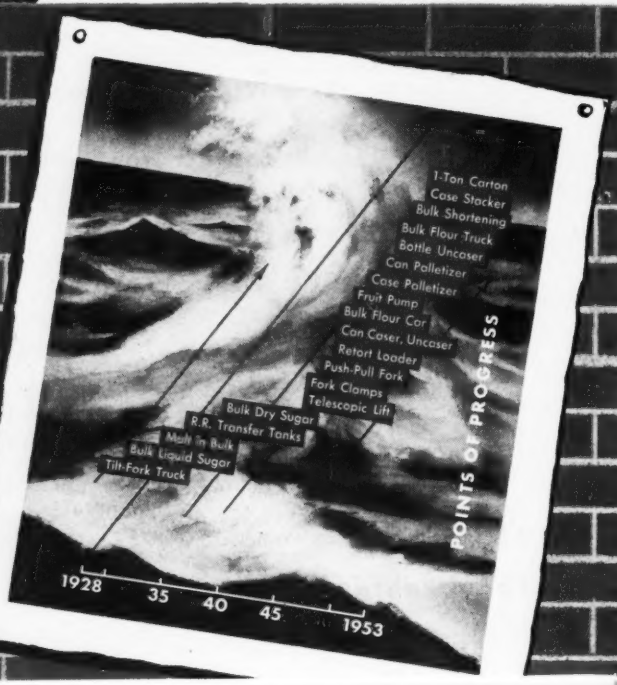
For FOOD ENGINEERING helps each kind of food plant use the experience of the others. It covers Smugg's kind of plant . . . *your* kind of plant . . . *all* food plants. It publishes more about food-plant operations and management—it has more subscribers—than any other food industry magazine.

That's because its bigger staff can spend more time and money for better articles. And FOOD ENGINEERING uses the unmatched facilities of McGraw-Hill . . . to check into all of American industry for new ideas food plants can use.

* * *

Walled in by his narrow view of things, Smugg misses all this. Waldin Smugg should *read* FOOD ENGINEERING . . . *all* of it, *thoroughly*. If you see him, tell him. If you see him in your mirror . . .

LOOK OVER YOUR WALL WITH **FOOD ENGINEERING**




* **MATERIALS HANDLING methods have been traded among food plants for years, as this graph shows. The "tidal wave of engineering" carries ideas from brewery to bakery to dairy, to all the industry. FOOD ENGINEERING helps you to benefit from this "idea exchange."**

## New Roller Bearings Are Small, Compact

Metallurgical and geometric refinements have made possible the development of these two new, smaller and more compact roller bearings. They were engineered to handle the loads of the front wheels of new automobiles.

New inner front wheel bearing, for example, has an outside diameter of 2.328 in., 0.113 in. smaller than its predecessor. The old inner front wheel bearing contained 15 rollers, the new contains 19. Similar refinements have been made on the outside front wheel bearing. New outside bearing measures 0.157 in. less in outside diameter than its predecessor. Old outside front wheel bearing contained 12 rollers, new has 14. The two inner and outer front wheel bearings weigh 25.5% less than the bearings they replace. Spindle length may in some cases be shortened and still retain wheel assembly. Material therefore can be saved on both spindle and hub. Machining time on these parts will be reduced and the amount of lubricant required is also correspondingly decreased.—*The Timken Roller Bearing Co., Canton 6, Ohio.*

**Circle 105A on Reader Service Card**

## Pliofilm Bags Benefit Packer Three Ways

Bloom retention, product visibility, and reduced shrinkage are benefits reported with use of a new Pliofilm bag for carcass meats.

Called Milpouch, new bag has been especially designed for beef quarters, primal cuts, and other similar items.

Material's transparency permits protection with unobstructed visibility both in the wholesaler's cooler and at point of delivery. Since material is shatter and tear-proof any puncture that may accidentally occur from a sharp bone or meat hook will be confined to its original area. Material has resistance to rough handling.

New bag is both air permeable and moisture-proof. Moisture collection problem is avoided by small holes prepunched in bottom of bag to permit drainage that may collect within. Further, since material does not absorb moisture, it will retain its strength even when adverse temperature conditions cause meat to sweat.

Material being air permeable permits meat to "breath," thus retaining its bloom. Bag reduces shrinkage with no signs of slimming, up to 10 days. Bag is reported to save approximately one-half of the normal 3 percent shrinkage undergone by the average beef quarter in a sales cycle from packer to wholesaler to retailer.

Milpouches come in eight different sizes for primal cuts of rounds, loins, ribs and chucks as well as for small, medium and large fore and hind quarters.—*Milprint, Inc., 4200 N. Holton St., Milwaukee.*

**Circle 105B on Reader Service Card**

**Common to All—Automatic Transmission**

**Here, every size truck of series features an automatic transmission. Model M100-24 pickup (right) has four-speed Hydra-Matic. Medium-duty model M450-30 has 8-speed. Heavy duty model DFM-660-47 diesel tractor (left) contains the multi-speed Twin Hydra-Matic.—*General Motors Co., Truck & Coach Div., Pontiac, Mich.***

**Circle 105C on Reader Service Card**

when every drop means costs against you...

## Remember

# RUBATEX *Insulation Hardboard*

## *Makes More Cents**

ZERO moisture pick-up of Rubatex Insulation Hardboard installed in your freezer plant, cold storage room or sharp freezer space means big savings for you. May be installed just as received from factory — no water vapor barrier need be applied. Here's positive moisture control low temperature insulation which prevents surface and internal condensation — resists deterioration — prevents damage to machinery and foodstuffs.

**PLUS**

* TEMPERATURE CONTROL SAVINGS — Constant low heat conductivity assures positive temperature control — prevents costly food spoilage.

* POWER SAVINGS—Requires only 53% as much power as other insulating materials to maintain low temperature.

* SANITATION CONTROL SAVINGS —Rot, vermin and termite proof—cannot breed or feed anything objectionable.

**TYPICAL INSTALLATIONS**

Abbotts Dairies, Inc.
Philadelphia, Pa.

Avco Manufacturing Corp.
Cincinnati, O.

Food Fair Stores, Inc.
Philadelphia, Pa.

Fruehauf Trailer Co.
Chicago, Ill. — Detroit, Mich.

Grumman Aircraft Engineering Corp.
Bethpage, L. I., N. Y.

Geo. A. Hormel & Co.
Austin, Minn.

The Liquid Carbonic Corp.
Chicago, Ill.

Write for our "Design Data Bulletin RBH-53", Dept. FE-7, Great American Industries, Inc., Rubatex Division, Bedford, Virginia.

## Low Compartment Body Speeds, Eases Trucking Jobs

Loading and unloading operations are speeded and eased with new "Low-Boy" pallet loading beer delivery bodies. Unit above is first one of 46 to enter fleet operations of Goebel Brewing Co.

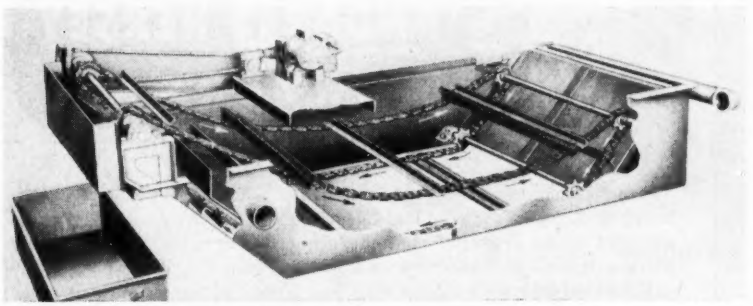
Outstanding feature is low height of compartments, 20 in. off ground. This is achieved by lowering frame of chassis ahead and behind rear wheels. Convenient loading height eliminates scrambling up and down body to load and unload cases.

According to truck body-builder, a 5 ft. 8 in. driver, standing on ground, can stack empties seven high. Low compartments take seven stacked cases, and wheelhouse compartments five, on usual 5½ in. pallet. One case in height can be added to both if loading is done by hand. Body also adapts itself well to hand loading. Capacity is 364 cases.

Full opening sliding doors are designed so that any single compartment or all compartments can be worked by driver at same time. There are four compartments on each side of body.

Removable bars in center of body permit entire load to be worked from either street or curb side as required. *—Herman Body Co., 440 Clayton Ave., St. Louis.*

**Circle 107A on Reader Service Card**



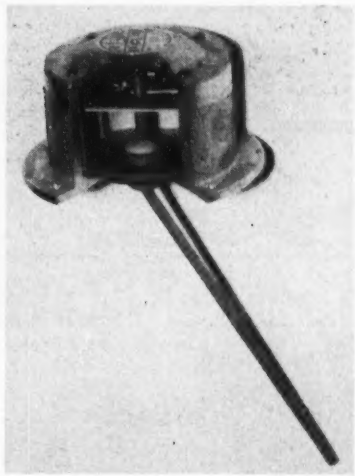
## Unit Removes Both Heavy and Light Solids

Continuous removal of floating chips and heavy, relatively fine solids to .004 in. screening is accomplished by this new settling and filtering unit.

Liquids of varying degrees of viscosity containing solids of different particle sizes and widely differing weights can be handled. Size of unit is dependent upon settling rate which is governed by gravity of solids and viscosity of liquids which determines retention period for a given rate of flow. System expels settled solids with chain driven flights. Filter screens are continuously cleaned by brushes which also serve as flights and aid in removing and expelling of settled solids.

Special bar type screens with accurate slot sizes provide for filtering solids that remain in suspension as liquid flows toward outlet. Especially designed for easy cleaning while machine is in operation, screens are furnished in slot sizes as small as .004 in. *—Industrial Filtration Co., Lebanon, Ind.*

**Circle 107B on Reader Service Card**



## Compact Device Controls Dry Material Level

Automatic control of the level of dry materials in a storage bin is claimed with use of a new shutoff device. Here's how it works:

A compact, completely sealed housing is bolted on the outside of a storage bin. Housing contains a switch connected with a spring, adjustable for sensitivity, which in turn is hooked to a rod running through a rubber sphere that is on the side of housing next to wall of bin.

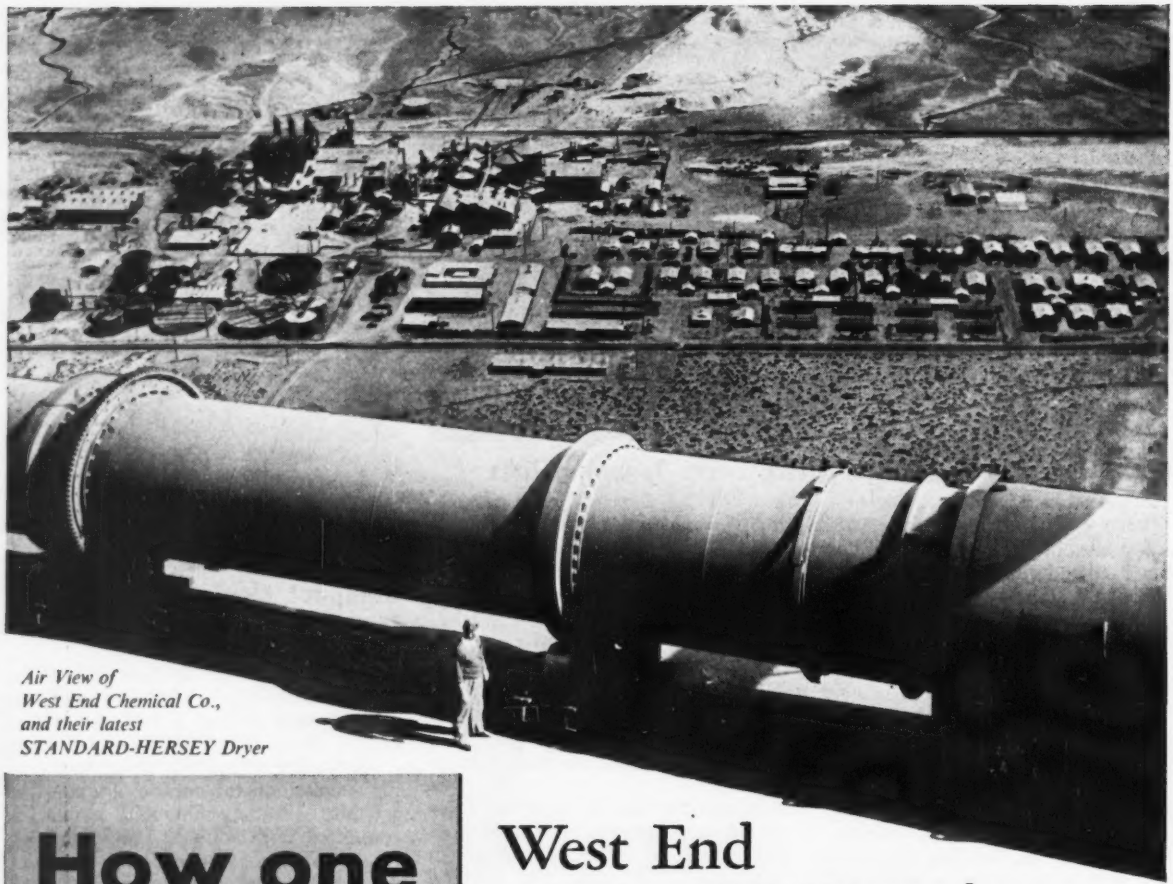
The sphere, which may be natural or synthetic rubber according to chemical nature of dry materials with which it is in contact, is enclosed in a housing that separates switch and interior of bin. Rod running through flexible sphere bends downward inside bin, and may be angled to any degree from horizontal except vertical.

This rod, called a "sensing probe", comes into contact with flowing material and, moving freely through flexible sphere, works spring to throw switch that cuts off flow at desired level.

When sensing probe goes downward, due to weight of materials reaching it, electrical contact breaks and flow ceases.

Unit has no floats, paddles, diaphragm mechanisms that get out of order due to material's clogging or chemical deterioration. No material can reach controls in housing. Dust, moisture and chemical-proof rubber sphere seals them out. Only parts exposed to materials are one side of sphere, and sensing probe. The latter is a solid piece of round stainless steel. *—Scrayco, 21 Greene Ave., Bound Brook, N. J.*

**Circle 107C on Reader Service Card**



*Air View of West End Chemical Co., and their latest STANDARD-HERSEY Dryer*

# How one GOOD DRYER

## LED TO ANOTHER ...and ANOTHER ...AND ANOTHER

# West End

CHEMICAL COMPANY *now has*

# 27 STANDARD HERSEY DRYERS

To tap the chemical resources of Searles Lake in California's Mojave Desert, it was necessary for the West End Chemical Company to set up a plant at the source of the raw product. Plant Equipment had to be rugged and dependable because repairs and replacement facilities were many long desert miles away.

Rotary dryers are vital to the West End process of manufacturing borates and soda products. Their first dryer in 1926 was a STANDARD-HERSEY and, with modifications, it is still in use. *West End has since purchased 26 additional* STANDARD-HERSEY *rotary dryers*—proof of STANDARD-HERSEY dependability.

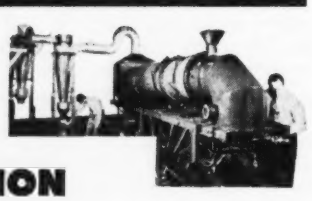
Standard Steel Corporation manufactures more than 30 dryer types. Special equipment can be engineered to fill specific dryer requirements.

**SEND FOR FREE 12-PAGE ILLUSTRATED BULLETIN**

THE STANDARD FOR 52 YEARS

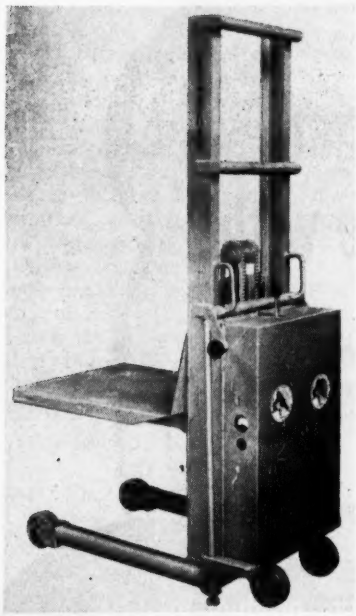
**COMPLETE PILOT PLANT TAKES GUESSWORK OUT OF DRYING**

STANDARD-HERSEY'S pilot dryers play an important part in solving your drying problems *before* blueprint stage.



**STANDARD STEEL CORPORATION**

**5045 Boyle Ave., Los Angeles • 7 East 42nd St., N. Y. 45**



## Electro-Hydraulic Stacker Accelerates Hoisting

Lifting tasks are speeded and eased with use of this new battery-powered Handy Hoister—a lightweight, compact electro-hydraulic stacker of 1,000 lb. capacity.

New design is available in two models, platform type and straddle type. Former has a carrying platform 30 in. long x 24 in. wide. Latter model has forks either 30 or 36 in. long and can handle pallets up to 48 in. long. Lifting height of both models is 58 in. and the weight approximately 500 lb.

Unit has a lift speed of 25 fpm. with 1,000 lb. loads. Electro-hydraulic power is furnished by a storage battery with a built-in charger which can be operated from any lighting circuit. Lifting and lowering of load is accomplished by a single control lever.—*Lewis-Shepard Products, Inc., Watertown, Mass.*

**Circle 109A on Reader Service Card**

## Plate Heat Exchanger Is Easy to Clean

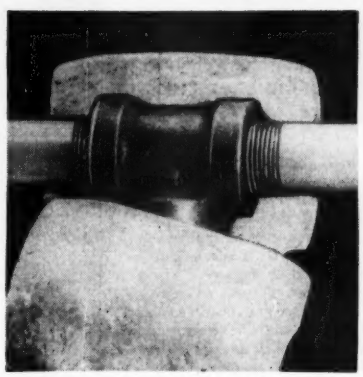
A new improved plate heat exchanger lends itself well to cleaning in place. Known as Sani-plate, unit comes in standard capacities of 1,000 to 40,000 lb. per hr. By merely adding new plate sections, capacities can be boosted inexpensively and quickly.

Exchanger can be used for heating, cooling and regenerating. It features "controlled" flow of fluids over only one path, assuring uniform heat exchange. Common velocities of fluids over only one path, assure uniform heat exchange. Common velocities of fluids over plates encountered with this design range up to 6 to 7 fps.

Unit operation has been made possible by development of a separate gasket. New sanitary gasket is a rigid stainless steel core, over which a molded Hycar covering is precisely fitted. Hycar is a plastic that seals with minimum distortion, and will not adhere to plates. To make gasket even more fool-proof, a horizontal leak detector groove is provided over full width of plate.

Stainless steel plates carry only a few support corrugations, and therefore wash down easily. Dissassembly of both gaskets and plates is simple. Gaskets may be installed or removed without dismantling heads, and gasket maintenance can be accomplished easily without returning plates to the factory or removing plates from the press.—*Pfaudler Co., Rochester, N. Y.*

**Circle 109B on Reader Service Card**



## Molded-Fitting Insulation Speedily Installed

Rapid installation on hot and cold line fittings is claimed with use of this new molded insulation.

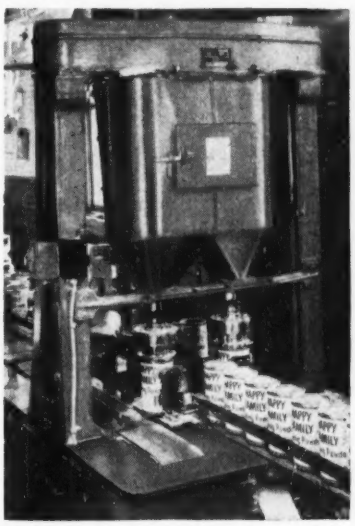
Made of fiber glass in preformed halves, insulation is light in weight, easy to apply, provides an attractive appearance and has long life. It may be used on moderate low temperature work and on heated piping to 450 deg. F.

Insulation is accurately molded to fit screwed and butt-welded fittings. Inside conforms to contour of fitting and outside forms a smooth, even curved surface which may be painted, or covered with canvas, vapor barrier mastic or cement. Two halves may be stapled, wired or taped together for permanent or removable attachment.

Product is available in sizes to fit standard screwed ells, tees, and 45's for pipe sizes from ½ to 8 in. pipe and butt welded long radius ells and 45's for pipes from 2 to 8 in. in size. Screwed tee insulation may be used to insulate gate and globe valves.

Uniform thickness of the insulation together with its high insulating efficiency insures minimum heat loss. It will not settle, flake, chip or crack, is not damaged by moisture and will not corrode piping.—*Owens-Corning Fiberglas Corp., Toledo 1.*

**Circle 109C on Reader Service Card**



## Dual Auger-Vac Feeder For Powdered Products

Coffee, cocoa, non-fat milk, flour and similar powdered products can now be easily and tightly filled into jars or cans at speeds up to 50 per min. Use of auger-vac equipment on the Model HG-84 duplex filler does the trick. Further, product loss

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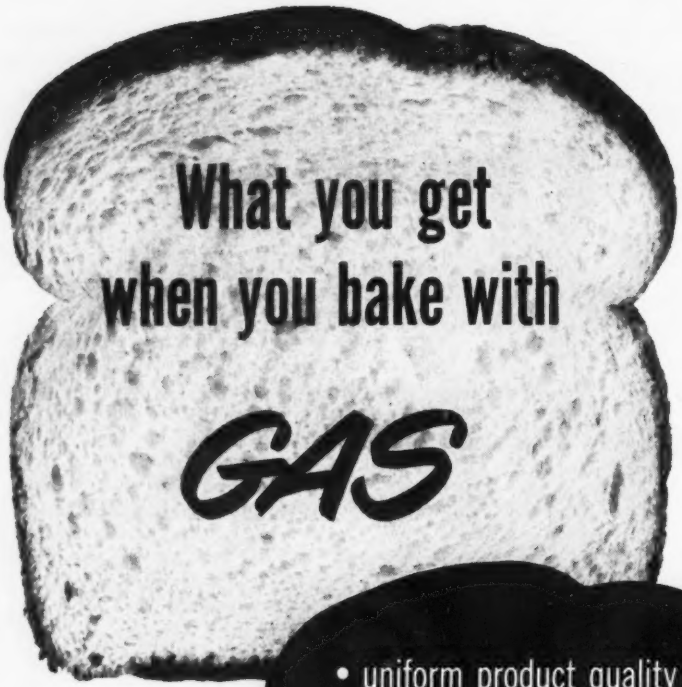


- uniform product quality
- economical operation
- lower equipment investment
- minimum maintenance
- modern attractive appearance
- cleanliness, dependability, flexibility

Whether you operate a large commercial bakery or a small variety shop, there are operation and product results to be realized when you bake with Gas. All these leading bakeries have found them. You can find them, too. Call your Gas Company Representative right away. He'll be eager and willing to discuss the economies and results Gas Baking Equipment can provide.

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COURTESY BAKERY, SAGINAW, MICHIGAN • VANCOUVER BAKERY, VANCOUVER, WASH. SKOWRONEK'S BAKERY, BERWYN, ILLINOIS • VICKI'S BAKE SHOP, ORLANDO, FLORIDA
ALGIERS BAKING COMPANY, NEW ORLEANS, LOUISIANA • PETER PAN BAKING COMPANY, ATLANTA, GEORGIA • KAHN BAKING COMPANY, EL PASO, TEXAS • WOODLAND PARK BAKERY, PORTLAND, OREGON • CHILLUM BAKERY, CHILLUM, MARYLAND • SNELLS BAKERY, PROVIDENCE, RHODE ISLAND • ACME BAKING CO., JACKSON, MISS.
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PETERSEN BAKING CO., CEDAR RAPIDS, IOWA • DEBUS BAKING CO., HASTINGS, NEB. ROYAL BAKING COMPANY, SALT LAKE CITY, UTAH • GINSBERGS BAKERY, DORCHESTER, MASSACHUSETTS • AUGUST BAKING COMPANY, CENTRAL FALLS, R. I. • FRANK'S BAKERY, CHICAGO, ILL. • LINCOLN HOME BAKERY, MILWAUKEE, WISC. • SCHMIDT'S BAKERY, BENSENVILLE, ILL. • JENSON'S BAKERY, CRYSTAL LAKE, ILL. • NEW YORK MODEL BAKERY, LYNN, MASS. • PETER WHEAT BAKERS, INC., JOLIET, ILLINOIS
JALISCO BAKERY, SAN ANTONIO, TEXAS • ENGELSTAD BAKERY, JAMESTOWN, N. Y. JOHN WEBER'S BAKERY, PORT WASHINGTON, N. Y. • SWITZER BROTHERS BAKERY, FINDLAY, O. • MODERN BAKING COMPANY, CICERO, ILL. • AUDREY PASTRY SHOP, CHICAGO, ILL. • BELL BAKERY, EL PASO, TEXAS • BEALLS BAKERY, ZION, ILLINOIS
NEW YORK BAKERY, INC., ATLANTA, GEORGIA • JOE SPATZ BAKERY, DAYTON, OHIO SMAYDA'S HOME BAKERY, INC., CLEVELAND, OHIO • KOOB BAKERIES, ST. LOUIS, MO.

*List of bakeries courtesy Paterson Oven Co.*

MORE AND MORE... THE TREND IS TO GAS FOR COMMERCIAL BAKING

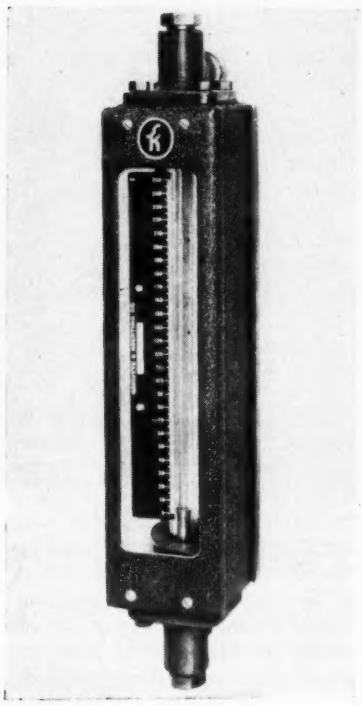
**AMERICAN GAS ASSOCIATION**
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

through "dusting" this is minimized.

Operation of the auger-vac set-up is simple. Before filling, a vacuum is first drawn on container by a motor driven pump. Desired amount of powder is then tightly packed into container by the auger head. Different sizes of heads are available for filling 8 oz., 1 lb., and 2 lb. cans. Same equipment can be used for filling any hard-to-pack powdered product.

Duplex machine provides completely automatic auger feeding with cam control. It is adjustable for widths 1½ to 6 in., thicknesses 1½ to 4 in., heights 1½ to 8 in.—*Stokes and Smith, subsidiary of Food Machinery and Chemical Corp., Philadelphia.*

Circle 109D on Reader Service Card



## Compact Rotameter Is Easy to Read

Safety, accuracy and versatility are features claimed for this new rotameter.

Completely enclosed steel meter case with detachable safety glass windows protect metering tube from external shock and acts as a safeguard in event of accidental tube breakage. Rigid construction gives precise end fitting alignment, eliminating pipe stresses on tube. Versatility is achieved by standardized construction which permits use of up to four sizes of meter tubes in one case. Variety of rotor designs available afford a wide range of capacities within one meter size.

Extra-wide front and rear sight windows provide maximum visibility, and detachable metal reference scale is plainly marked for ease in reading. Scales are available calibrated either in units of flow, or in millimeters for use with calibration charts.

Rotameter can be adapted for electric, or pneumatic transmission and remote recording of fluid rate of flow. —*Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.*

Circle 111A on Reader Service Card

# New Chemicals

## Poultry Scalding Aided By Powdered Material

Four advantages are claimed for a new defeathering agent—a powdered alkaline-type material—used in poultry scalding operations. The four are:

It permits lowered scalding temperatures thereby reducing discoloration or "barking" of birds; poultry picks easier, allowing rollers with rubber beating belts to be lowered; birds come from defeathering unit with fewer bruises and blemishes, and solution's free-rinsing action simplifies cleaning of scalding tank at end of day's run.

Extensive tests, manufacturer reports, reveal material has no harmful effect on birds and leaves no residual film on carcass. Maker further states, material used as a defeathering agent in scald vats is acceptable to Poultry Inspection Section, Poultry Div., U. S. D. A.—*Oakite Products, Inc., 126 Rector St., New York City 6.*

Circle 111B on Reader Service Card

## Additive Hastens Cleaner's Action

Fast, safe and effective floor cleaning is reported with use of a new cleaner.

Incorporated in new cleaner is an additive stated to speed up cocoanut oil action in lifting dirt, grime and foreign material off floor quickly and holding it in suspension for easy removal with wet-pick-up vacuum cleaner, floor squeegee or mop.

Defined as a blend of fine ingredients in highly concentrated form, cleaner with additive and cocoanut oil base is guaranteed to contain a minimum soap solids of 26 percent. Mixing 1½ fluid oz. in gal. of hot or cold water, is reported to do most cleaning jobs. For easy removal of ordinary wax build-ups, a solution of 1 gal. of water to 8 oz. cleaner is recommended.

Cleaner is also available with germicide antiseptic added, which eliminates odors and kills harmful bacteria or fungus organisms.—*Multi-Clean Products, Inc., 2277 Ford Parkway, St. Paul 1.*

Circle 111C on Reader Service Card

## Added Ingredient Cuts Cake Icing Troubles

Addition of a new ingredient called Hiflex to Pic 77 is claimed to provide greater stability, and easier handling of icings on wrapped sweet goods and cakes. With new material, maker states, cracking, chipping, peeling, and shaling are virtually eliminated as icing problems. Icing made with new ingredient is reported to perform well under all adverse conditions of weather and handling.—*Mallet & Co., Inc., 601 E. General Robinson St., Pittsburgh 12.*

Circle 111D on Reader Service Card

## Cleaner Cuts Troubles With Can Labels

Many oils and greases can be readily removed from filled cans of food products with use of a new cleaner. Unless thoroughly removed, these oils create trouble with label adherence.

New cleaner, designated 92C-XX is a buffered alkaline containing a highly effective wetting agent. It is guaranteed not to attack or spangle tin or aluminum.

Cleaner is used at a concentration of 4 oz. per gal. of water, at a temperature of 180 deg. F. Cans are dipped, completely immersed, in solution for a short period, drained and rinsed with water, preferably hot, to speed self-drying action and to ready them for labelling.—*Magnus Chemical Co., Inc., South Ave., Garwood, N. J.*

Circle 111E on Reader Service Card

### Want More Information?

**It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—last page. Then sign at the bottom and mail.**

**For your convenience, too, items in this department are listed and keyed in the Reader Service Section.**

# In Behalf of Progress . . .

## Mid-Year Outlook Points Up Industry Progress

Now that half of this much-advertised year of "recession" is past, it is encouraging to take a look at the record. To do so may help to form your future plans—or at least to make your vacation more enjoyable.

Industry in general is not doing badly. The food manufacturing industry in particular is moving ahead faster than the average.

Food plants awarded more new construction contracts in the first three months of this year than any other industry. The figure is 84% above that for the corresponding period of 1953. All other industries, with a single exception, reduced the number of contracts, the overall drop being 36%.

In dollar value of contracts, food factories were second only to the chemical process industries. Their expenditure was up 7% compared to the all-industry fall-off of 67%.

For the entire year of 1954, food manufacturers anticipated that spending for new plants and equipment will be 6% higher than in 1953, 10% above 1952, and more than in any year since 1949.

Last year our industry's capital expenditure totaled $818 million. Indicated '54 figure is $865 million.

Average profit margin for the food manufacturing field pulled up from the 1952 low of 2.2c. on the sales dollar to 2.5 in 1953. The benefits of modernization which contributed to this improvement continue to pay dividends.

While the stable food industry is moving ahead in this "recession" year, its market is to some extent dependent upon the general business trend. So let's see how this trend is sized up by the McGraw-Hill Department of Economics.

Its analysis comes up with the clear-cut indication that there will be no grave business decline between now and fall. At the same time, one cannot draw the conclusion that the readjustment is all over and we are on the way up again.

The summer course of business is seen as going "sideways," with more tendency to go down slightly than up. No force is seen in motion, or immediately in the making, which is certain to give the economy a large lift.

In spite of a lack of business buoyancy, the country will be maintaining a level of general activity without precedent, except for one year, in the history of mankind.

So there's no cause for gloom. Go ahead with your plans for progress. And relax and enjoy your vacation, for your business likely will be there when you get back.

## Lesson for All in Frozen Food Success

Salute the frozen food business—in this, its 25th Anniversary year! And take some lessons from it.

Clarence Birdseye's experience as a Labrador fur trapper taught him the practical effect of nature's quick freeze system. And he engineered this observation into the famous multi-plate quick freezer and into a product and process combination with a multi-billion dollar potential.

Then followed some daring business operations, out of which General Foods Corp. was formed. And GF started out to nurse its puny infant division, Birdseye Frosted Foods, Inc., to health.

To the public at that time, all frozen food was synonymous with "cold storage." The stuff had two strikes against it.

Quick frozen foods demanded new methods of processing, distributing, and merchandising. New quality control know-how had to be developed, and proper packaging. It was even necessary to develop new varieties of fruits and vegetables for freezing.

There were no facilities for handling quick-frozen foods in retail stores. For that matter, there were no adequate transportation or warehousing facilities.

But there was no shortage of optimism. Nor any lack of determination on the part of the pioneering General Foods to lick its problems.

Technical research went to work in a long hard battle. Mistakes were made, but one by one the problems were brought under control.

Yet in 1933, frozen foods still was a sad, sick business. And then came a courageous cure. Birds Eye reversed the usual procedure for success. It calculated the business volume necessary to make a profit—a $10 million figure some distance the other side of reality. Then the lowest profitable retail prices at that "dream" volume were determined and applied. And the flood of outgoing GF dollars swelled some more!

But business grew. And early in 1940, Birds Eye launched a big drive for national distribution. Then came the wartime boost for quick frozen foods, and the boom was on.

This brought too many inexperienced packers and distributors into the business, glutting the market in 1946 with inferior products. The lusty young business nearly went under. And 200 packers folded up in the next two-years.

But Birds Eye and other stalwarts saw it through. And in 1953 some 1,400 companies packed nearly 3½ billion pounds of quick frozen foods.

It's an example to remember when you face a challenging situation.

# Celite Filtration assures perfect clarity—

## adds eye appeal and buy appeal to food products

TO GIVE foods and beverages that extra quality which results in more sales appeal, leading processors depend on Celite* Filtration.

The Celite method is *efficient.* It removes even the finest suspended solids. Moreover, Celite Filtration is *economical.* It may be used with any type of conventional filter, it is almost automatic, and skilled labor is not required for routine operation. And Celite Filtration is *flexible.* To meet your specific requirements, Celite comes in nine standard grades of microscopically controlled particle size. The right balance between degree of clarity and rate of flow may be easily controlled.

To purify water in large volume—to achieve brilliant clarity in many food products such as sugar, syrups, wine, beer, vegetable oils, cooking fats—to remove many colloidal impurities which may affect product quality . . . Celite Filtration offers unexcelled results.

A Johns-Manville Celite Filtration Engineer will gladly discuss the advantages and use of Celite in your product or production process. For his services, without obligation, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JOHNS-MANVILLE JM PRODUCTS

**Johns-Manville CELITE** FILTER AND PRESSING AIDS



TURN PAGE FOR FOLDOUT FLOWSHEET →

**1** **KEY to new process is this three-stage steam jet system (A), water cooler (B), and boiler assembly (C). Employed is high-vac evaporative cooling to remove heat from cooked fowl—accomplishing in 20 min. a former 12-hour operation.**

# Engineered Line for Frozen Poultry Pies

## Vac cooling cuts processing time, zooms output

PIONEERING in the application of basic engineering to frozen poultry pie processing marks the operations at Clark's Ranch Kitchen, Temple City, Calif. High vacuum evaporative cooling of the fowl is the big step forward.

Heart of the process is a three-stage low-level barometric steam jet system—Point (1) on accompanying flowsheet. In operation, 1,000 lb. of eviscerated birds are placed in a perforated stainless steel basket equipped with trap bottom. Basket is lowered into a stainless processing kettle (2) equipped with steam jacket and vacuum connections. Water is added to cover fowl, and batch is pressure cooked for 35 min. at 235 deg. F. After cook, fat is removed by flotation. Water is carefully introduced and fat level is observed through an inspection port. Fat leaves through an over-flow pipe and is collected for gravy stock, called roux.

Poultry broth remaining in this kettle now is pumped to one of two vacuum equipped gravy kettles (3) and also to the mixing kettle for production of roux. This latter kettle receives measured amounts of fat, flour, and seasoning. Broth from the cook is added to render the roux fluid for pumping to gravy kettle.

Fowl are cooled after removal of fat and broth. Water is introduced to a level below product basket and unit is sealed. A vacuum of 29.5 in. is applied and heat is transferred from fowl to water vapor formed by evaporative cooling. This cooling takes less than 20 min. as contrasted with former time of 12 hr.

**FOR THE STORY** behind these advances see p. 60

Chilled fowl are transferred to boning room, maintained at 60 deg. F. Here the meat is stripped and diced. Then it is moved to storage room, kept at 36 deg. F.

Gravy is formulated by blending roux and broth in one of two 300-gal. jacketed, stainless vacuum kettles equipped with agitators. The agitator units are equipped with continuous, Neoprene knives. Steam is applied, heating the gravy to 195 deg. F. This temperature is maintained for 15 min. Unit then is sealed and vacuum applied in two stages.

Primary jet system produces 26 in. vacuum, and this is maintained until temperature drops to 100 F. When lower temperature is attained, booster jet component is energized, vacuum rapidly climbs to 29.5 in., and temperature falls to 60 F. Gravy is now ready to be pumped direct to pie line.

Dough is prepared in a refrigerated room, with chilled ingredients employed to produce a mix of proper texture. And it is delivered in troughs to a divider, which shapes the dough into charges of proper size and weight for top and bottom crusts. Divided dough proceeds to high speed crust roller. Then formed crust is manually transferred to the pie line.

Production of pies is on a straight-line pie machine. Fluted aluminum-foil pans are put in metal jigs, four to a section, and operator transfers rolled sheets of dough into the pans. Next, a "docker" tamps the dough into place. Then operators measure weighed amounts of diced poultry into each pie pan.

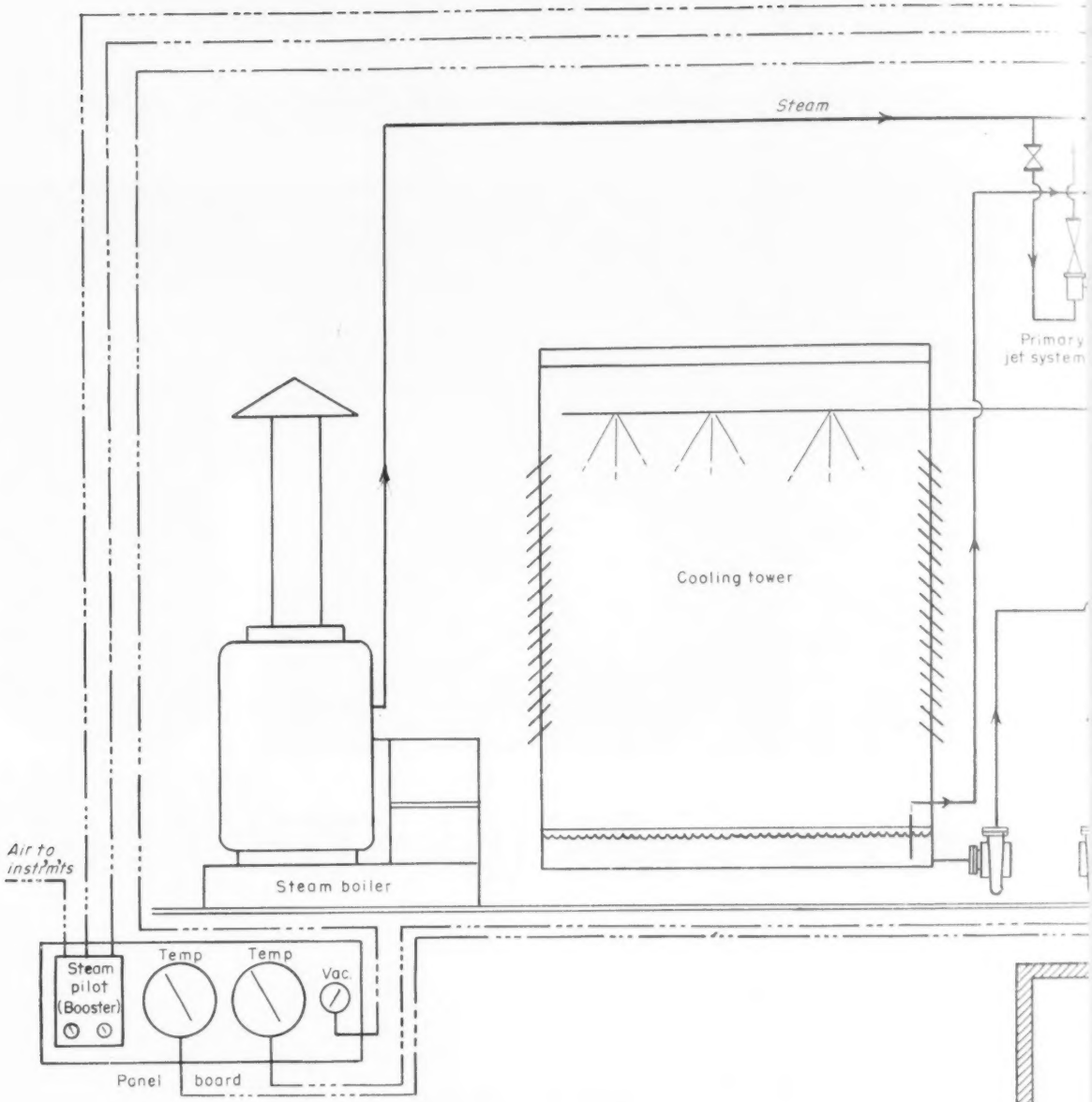
Pies now proceed to the station where gravy is continuously metered into each one by means of a variable-speed positive-displacement pump. Action at this station is automatically controlled by rate of the master pie line.

Added next is the top crust dough, and then the finished pies pass through a station for trimming and crimping of the crust.

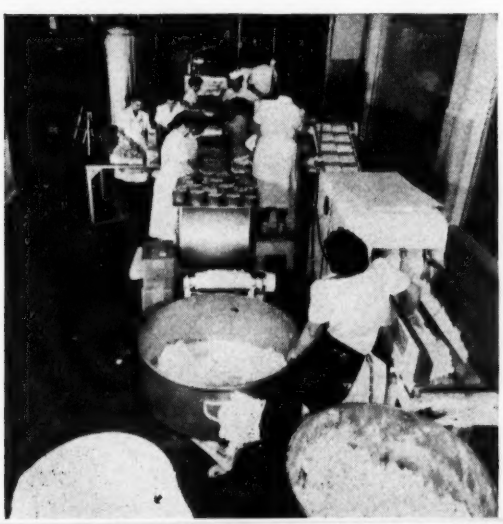
Pies are racked on interlocking trays, which are stacked on dollies for movement into the sharp-freezer room. From here, the frozen products are moved to automatic packaging line for placement in individual cartons, which are wrapped in lithographed waxed paper for ultimate shipment to the various markets.

Operations are geared to produce 7,000 poultry pies an hour.

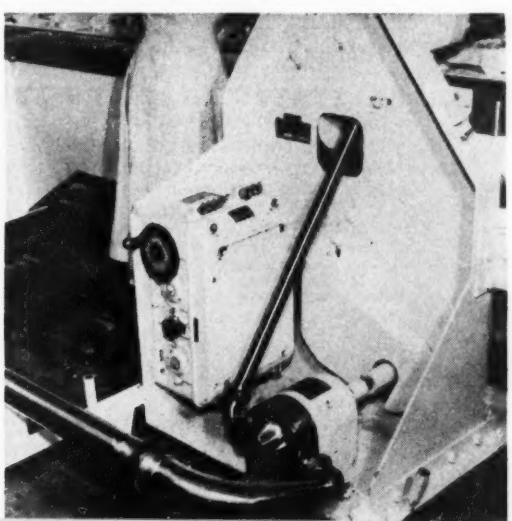
UNFOLD HERE

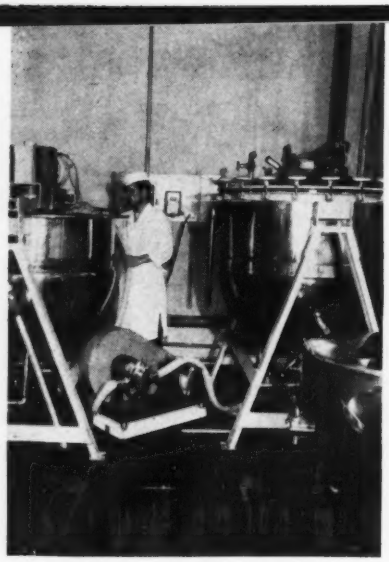



**4** **DOUGH** from troughs goes to divider for shaping into proper sizes for crusts.

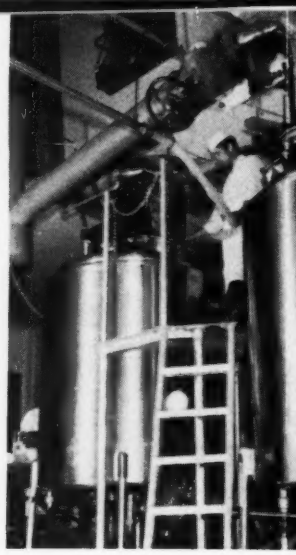


**5** **SPEED CONTROLLER** regulates pumping of metered amounts of gravy into pies.

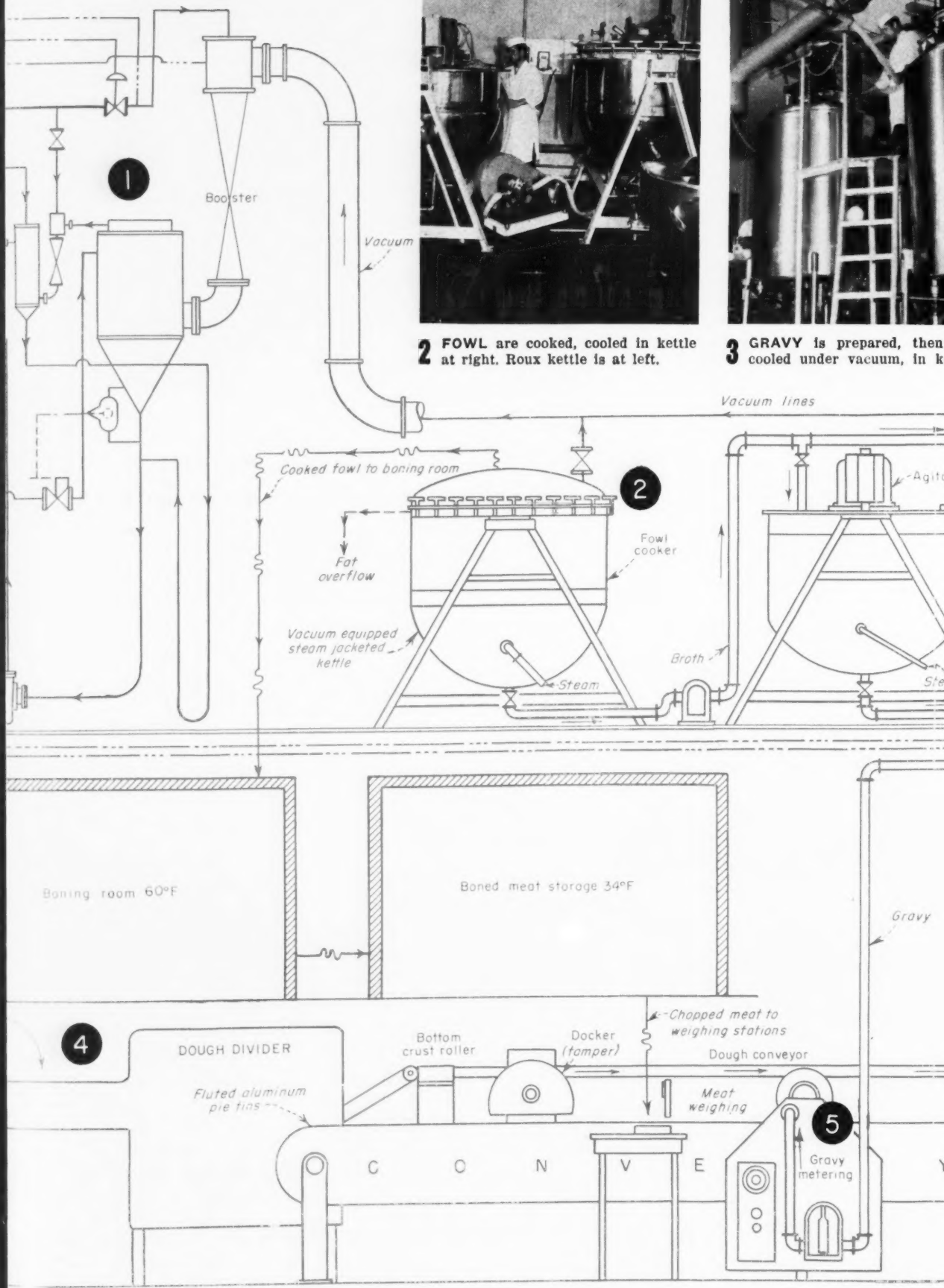


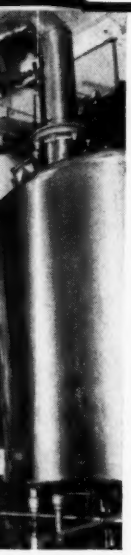


**2** **FOWL** are cooked, cooled in kettle at right. Roux kettle is at left.



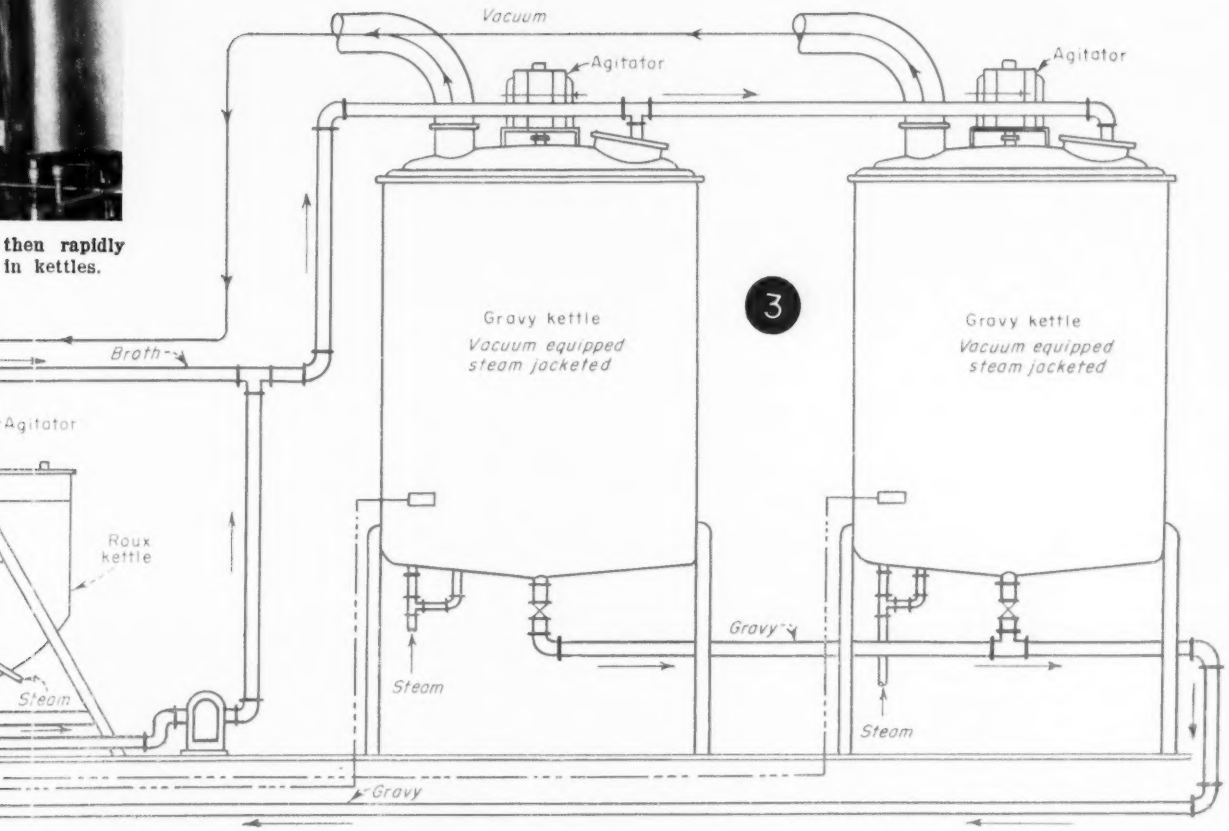
**3** **GRAVY** is prepared, then cooled under vacuum, in k



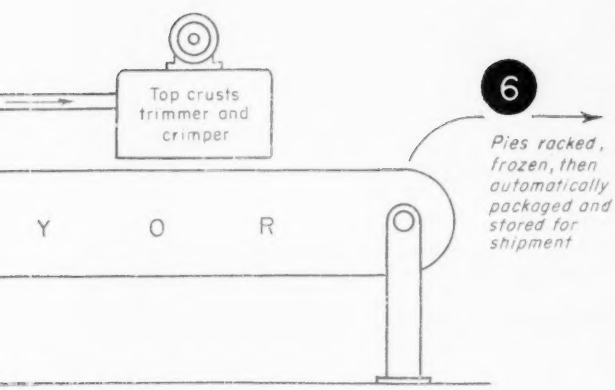


**then rapidly**
**in kettles.**

FE PICTURE FLOWSHEET NO. 67




**6** **PIES** go on trays. And these are stacked on dollies for movement to freezer.



# Grandma didn't need any Fulscope* Controllers!

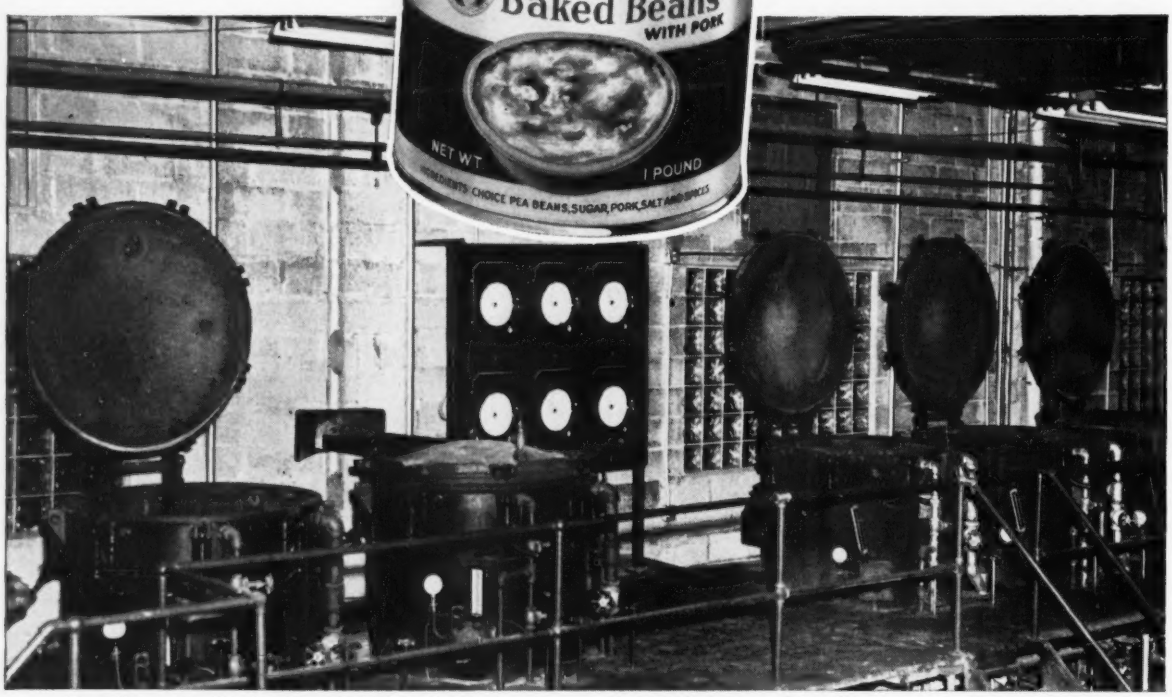
***...but Robert E. Brown, President and Treasurer of Grandma Brown's Baked Beans, says—"Without automatic controls we couldn't have expanded production."***

When Grandma Brown was in the kitchen no one had to tell her when the beans were cooked. And she didn't have to worry about such things as sterilization, because the local grocer sold them right out of the baking pan. Today you can buy these delicious home style baked beans by the can throughout New York and several neighboring states. Their Mexico, New York plant turns out close to 1,000 cases a day.

Automatic controls, as Mr. Brown points out, have permitted this very considerable expansion without sacrificing the original goodness of the product. They have also reduced production costs, saved processing time and insured that characteristic "home baked" flavor in every batch of beans. The Taylor system on the retorts shown below, controls the all important sterilization process. For each retort a FULSCOPE* Temperature Controller, equipped with a Process Timer and acting upon Hi-Flow valves, automatically controls the temperature, times the process period, and blows down the retort. Except for loading and unloading, the cycle is completely automatic.

The Grandma Brown story is another spectacular example of the way automatic controls can help little acorns grow into mighty oaks. There are Taylor control systems designed for every phase of the canning industry. Call your Taylor Field Engineer, or write for **Catalog 500.** Taylor Instrument Companies, Rochester, New York, and Toronto, Canada.

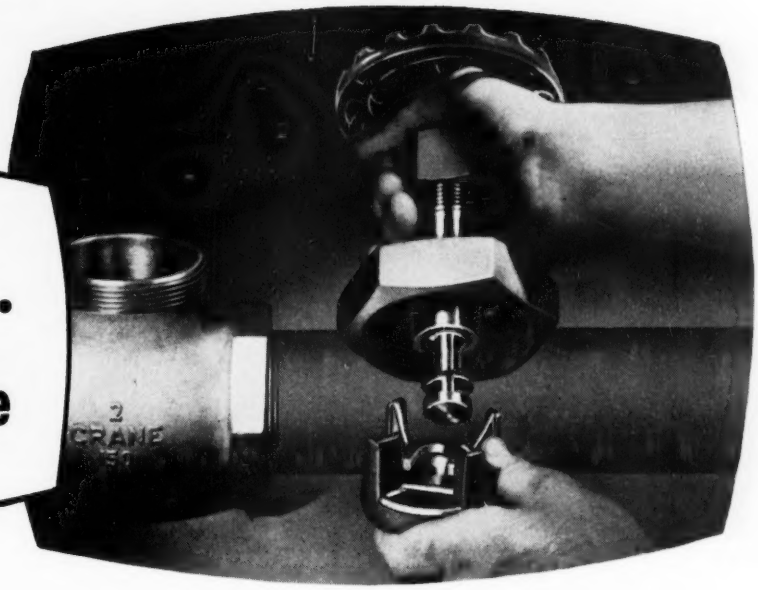
*Reg. U.S. Pat. Off.

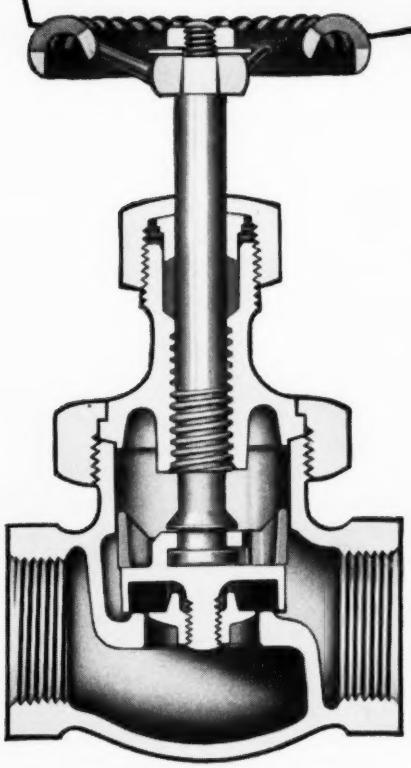


*Row of retorts at Mexico, New York plant of Grandma Brown's Home Baked Beans. The all important sterilization process is automatically controlled by Taylor FULSCOPE Controllers seen on panel.*

**Taylor Instruments MEAN ACCURACY FIRST**

# A New Disc . . .
# A "New" Valve



## Crane No. 7 Brass Valves with quick-change composition disc

Save time, trouble, and money by standardizing on these Crane quality 150-Pound Valves. Simple to service. No big inventory of replacement parts. Just a few extra disc holders . . . a supply of composition discs. That's all you need for a wide variety of fluids . . . and an economical maintenance program.

The composition disc takes most of the normal wear—stands up well under ordinary usage—seats easily even on air and gas—absorbs foreign particles that might cause leakage in metal disc valves. When a leak shows up, make a "new" valve—with a new disc. Simply dismantle the union ring, lift out the trimmings, replace the disc holder assembly. Takes only a few minutes. Save the disc holder you removed—use it with the next replacement disc.

Rugged construction throughout. Sturdy bonnet joint, well reinforced by heavy union ring—can be repeatedly dismantled and reassembled. Get better acquainted with the Crane No. 7 line . . . for steam, hot and cold water, air, oil, gas, gasoline, and many other fluids.

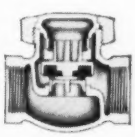
**GLOBES, ANGLES, AND CHECKS**

**Ask for folder AD-1682R—contains full facts on the No. 7 brass valve line and the companion No. 27 check. Your Crane Representative has a copy for you—or write direct to address below.**

**No. 7 Globe**
**Sizes ⅛ to 3-inch**

**No. 7 Angle**
**Sizes ⅛ to 3-inch**

**Specify No. 9 for Flanged Ends**



**No. 27 Check**
**Sizes ¼ to 3-inch**

***THE BETTER QUALITY . . . BIGGER VALUE LINE . . . IN BRASS, STEEL, IRON***

# CRANE VALVES

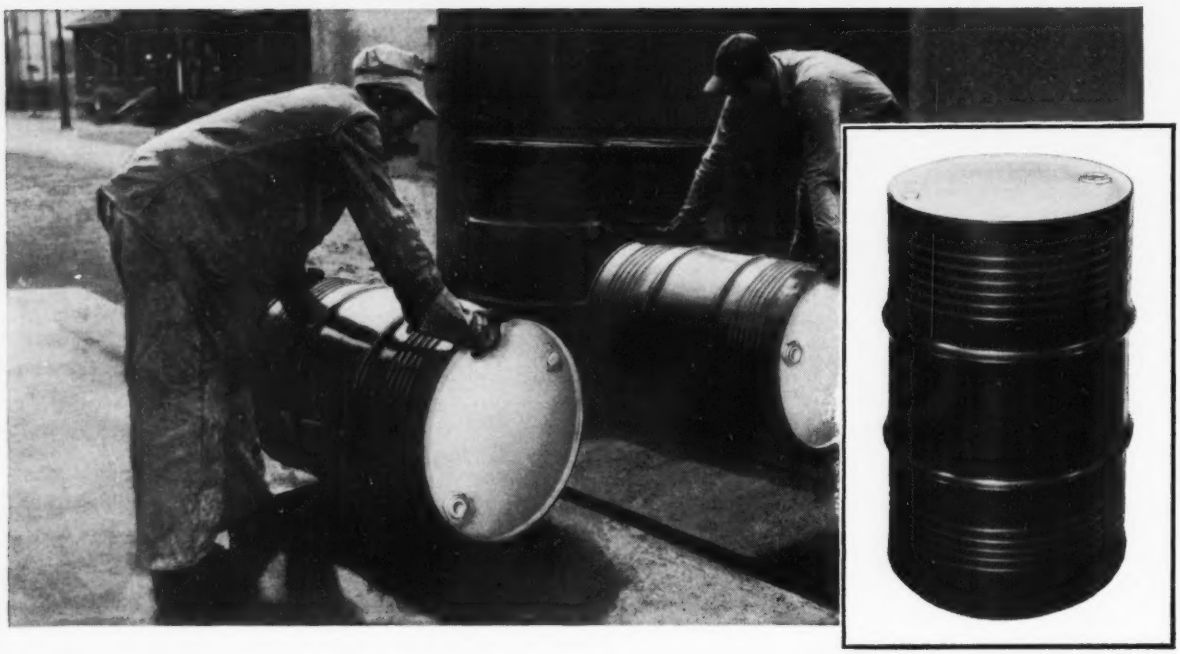
CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
*Branches and Wholesalers Serving All Industrial Areas*

***VALVES • FITTINGS • PIPE • PLUMBING • HEATING***



For more information, use coupon on last page.

# Want to carry quality control right into your customer's shop?



# You can . . . with USS STEEL DRUMS

THERE'S no need to stop quality control when products leave your plant. With USS scale-free, rust-inhibited Drums you can carry it *all the way* . . . when your customer is ready to use your products, they will be as clean and uncontaminated from scale, dirt, grease and rust as when they were packaged.

Whether your products are to be shipped long distances, stored for a long time, or both, their quality is well guarded in safe, sturdy USS Steel Drums. They're safe because a tight rust-resisting coating is applied over a surface that's been completely cleaned. They're sturdy because they're made of high-grade USS Steel. USS Steel Drums are better for you . . . better for your customers.

• United States Steel Products fabricates stainless, galvanized, tinned, painted and decorated drums and pails. Furnished in a wide range of capacities with a variety of fittings and openings to fit your particular requirements.

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**DIVISION**
**UNITED STATES STEEL CORPORATION**
**DEPT. 674, 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.**
Los Angeles and Alameda, Calif. • Port Arthur, Texas • Chicago, Ill.
New Orleans, La. • Sharon, Pa.

***Write for free brochure***

For additional information on this quality steel drum write to us at New York for this full-color brochure, "USS Drums—100% Scale-free and Rust-inhibited."

*"It's Better to Ship in Steel"*

**USS STEEL DRUMS**

**UNITED STATES STEEL**

**Uncoated Bottle**
**Readily scratched**

**But even after this vigorous rubbing . . .**

**. . . Coated Bottle**
**Remains clear**

# Silicone Toughens Bottles

Large packer achieves faster output on filling line, less shipping breakage, using new coated containers. . . . "Release" properties also seen improved

**FE STAFF**

A hot development now coming up in the food packaging field is the use of silicone-treated glass containers.

One leading packer of fruits, for example, has increased filling-line performance almost 14% with use of the plastic-coated glass jars. Output has jumped from 7,200 cases per day to 8,200.

The increased throughput is credited to better lubricity of silicone-treated jars relative to their contacting one another. They create less jam-ups, assure smoother line performance.

Equally impressive has been the drop in breakage rate on this packer's filling line. It fell to about $\frac{1}{10}$th that formerly experienced — down to 0.014%, as against the common rate, ranging 0.1-0.3%. So states Brockway Glass Co. which, with General Electric Co., made announcement of the new treatment.

Trouble with surfaces of freshly-made glass containers is their vulnerability to damage. Due to lack of lubricity, they tend to "seize" upon each other, and thus cause scratches. These scratches are likely to occur during operations of inspecting, handling, packing, and then shipping the jars to food packers.

### Notable Advantages

The scratches may reduce the tensile strength to $\frac{1}{10}$th the inherent strength of unscratched glass. What's more, continued attack by water at the scratches will further lower glass strength. As a result, breakage will take place on the food packers' filling lines and during shipment of filled jars.

But coatings of silicone*, applied in the right stage of the glass making, are designed to provide a protective, lubricating film to minimize damaging seizure and scratches, improve appearance and "feel" of jars, and reduce losses during storing, filling, and shipping. Seen, too, are lower outlays for protective packing materials.

In addition, these coatings impart properties of water repellency and "release." These factors are being examined with interest by packers of those foods that tend to cling to container walls. Such foods should drain more cleanly—pour more freely from silicone-treated containers.

The feel of containers is improved, and yet their surfaces do not become actually oily. Hence there is little difficulty in handling them during inspection and packing.

Siliconed containers also have a desirable sheen and glint, which is in contrast to smokey-looking jars or bottles. The durable new coatings reportedly protect containers through repeated pasteurizing and cleaning cycles —even in alkali baths.

Further, there is the factor of the treatment enabling light-weight single-trip bottles, to withstand more shock and pressure. This opens possibilities for lighter returnable bottles, which should result in savings on the glass makers' raw materials and on repeated shipping costs of the food packer.

### Shipping Breakage Curbed

Recent tests by Brockway engineers prove that the hydrodynamic strength of siliconed bottles is maintained. Percent of breakage in 11-in. drops was

(Turn to page 135)

* SM-70 oil-in-water emulsion of a polymerized silicone fluid, General Electric Co., Waterford, N. Y.

there's a
reason for reaching!
frozen foods
packed with

# PFIZER ASCORBIC ACID or ASCORBIC-CITRIC MIXTURES

● When housewives reach for a specific brand of fruit or fish time-after-time, there must be a reason. Behind that preference is usually a better product. One way to keep them reaching for *your* brand is to use either Pfizer Ascorbic Acid or Ascorbic-Citric Mixtures to improve the taste and appearance of your packs.

In fruits... Ascorbic Acid has been successfully used for many years to retard browning and flavor loss in peaches. Numerous packers are achieving the same outstanding results in treating cherries, apricots and apples.

For fish... Ascorbic Acid prevents "rusting" of the fatty portion... preserves natural colors ...cuts atmospheric oxidation, source of rancidity and strong, unpleasant taste. In both fruits and fish, Pfizer Ascorbic-Citric Mixtures give the same effective control of oxidation *at much lower cost.* For more information about Pfizer antioxidants call or write...

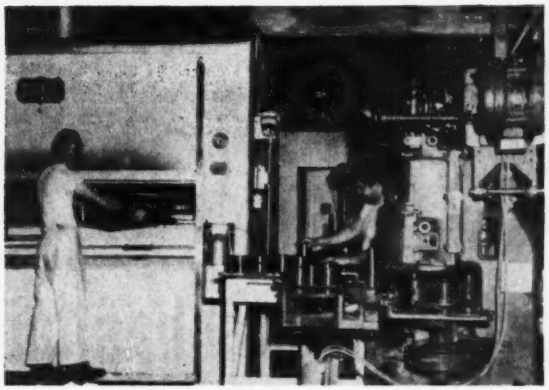
**CHAS. PFIZER & CO., INC.**

630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.
Vernon, Calif.; Atlanta, Ga.

*Manufacturing Chemists for Over 100 Years*

Pfizer

Scaled into cans, special bread dough . . .



. . . is baked. Then cans are vac-sealed

And here's ever-ready product

# "Canned-Handy" Baked Goods

—give Mrs. Housewife quality, convenience products that remain constantly oven-fresh on her shelf until the time she needs them

**FE STAFF**

A Philadelphia baker recently took a good hard look at his business—seeking some new consumer-convenience angle for providing oven-fresh breads and cakes other than by freezing or by "brown-'n-serve" partial baking.

**Right off, he hit upon a most promising twist. It was the trick of baking doughs and batters in cans and then immediately vacuum-sealing them as they came from the ovens.**

This technique, actually pioneered at the Quartermaster Food & Container Institute in Chicago (May '53 FE, p. 86), enables the housewife to buy a week's or a month's supply of bread and cakes at a time. Inasmuch as they remain fresh indefinitely, she merely opens a can of her favorite variety whenever the need arises.

Demands for these fresh-out-of-the-oven breads and cakes are mounting, states the baker, Canned Bread Specialty Co. Some restaurants and highway diners have found them ideal for regular as well as emergency use on holidays and weekends. Folks at summer resorts (in cottages) and in rural or farm areas have found them equally convenient.

Also, some are being shipped overseas as welcome gift packages. And of course they may be supplied to our fighting men in any part of the world.

These canned baked items can be pantry-shelf stored for months and opened in a jiffy to provide on-the-spot, out-of-the-oven freshness.

Canned, vacuum-packed breads now being packed include: 100% whole wheat, plain rye, 100% gluten, white, corn, pumpernickel, and rye with seeds. Available, too, are four types of cakes: angel food, golden pound, whole wheat pound, and pecan coffee cakes.

Also being canned are salt-free and sugar-free breads and cakes for dietetic purposes. And soon to appear will be cheese and raisin pound cakes.

### Long Research

Special formula and process development took 3½ years before acceptable breads and cakes could be commercially canned. Bread doughs, prepared according to regular formulas and then baked in cans, created difficulties—either due to hard-to-control, spoilage-causing spore-forming organisms, or to the development of a core (undesirable hard ridge) around the crust of the baked loaves. (*Turn page*)

# Certainly...

## Continental has tailor-made package service for "sweet tooth" items

**CONTINENTAL PACKAGES ALMOST EVERYTHING**

It always pleases Continental customers to find us as interested in their products as they are. Supplying beautifully lithographed containers for fine foods is only one way we show our interest. We aim to work with you as if you were our only customer. We schedule deliveries to your convenience and not ours. We make available engineering and research services in just the quantity you want. If need be, we can put a hundred experts on your special problem. Let us show what our tailor-made package service can mean to you. Give us a call, soon.

**Is your product listed here?**

*Let us show you containers designed for:*

| | | |
|---|---|---|
| brown bread | glazed fruit | plum pudding |
| candy | ice cream mixes | popcorn |
| date bread | nut bread | potato chips |
| fountain syrups | nutmeats | pretzels |
| fried noodles | nut butters | shoestring potatoes |
| fruit cake | peanuts | table syrups |

*and many other food specialties*

**CONTINENTAL CAN COMPANY**

Eastern Division: 100 E. 42nd Street, New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Bldg., San Francisco 4

What's more, volume control of canned-baked loaves posed problems. Loaves were either under-sized or they expanded so much that cans were distorted. Then, too, regular doughs resulted in formation of moisture within the cans. And finally, there was the chance of botulism.

These difficulties were resolved step-by-step through development of a short-time fermentation process and other techniques. To overcome moisture condensation within the can, less water than normally employed was mixed into the dough and a higher percentage of shortening was added.

A departure from normal practice is this baker's method of running the fermented dough through a series of circular knives that cut it to kernel size. Dough pieces then are forced-air-dried in a drying tunnel to a low-moisture content. Dried dough is now ground into a powder, which then is reconstituted with water to produce a bread of 34% moisture.

At this point, sufficient edible lactic acid is added to reduce the pH to 4.6, to stop subsequent anaerobic growth of *Clostridium botulinum*.

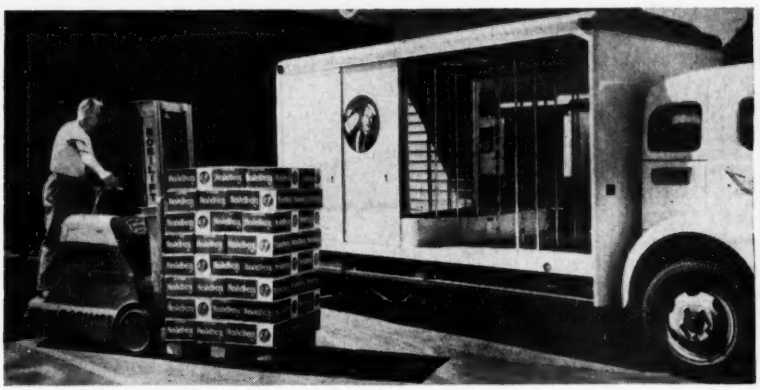
Short proofing (10 min. instead of conventional 45-60) in 401x411 cans prevents formation of too much $CO_2$ and permits volume control. Next step is baking the canned dough at 375 deg. F. for 30 min. Olive drab (on outside), rather than plain tinplate solid cans, were selected because of their lower heat reflectivity and baking-time requirements.

★ ★ ★

Immediately after baking, the cans are vacuum-sealed (20+ in. of vacuum. Cans are then loaded on racks and cooled within 1 hr. by air circulated by fans.

Big problem in making pound cakes was to develop a formula to produce a cake with the proper volume. Over 20,000 cakes had to be thrown away because their volume either was too low or too high. Low volume resulted in unsalable, cracked cakes, whereas those with too high a volume warped or broke the cans.

High vacuum could not be employed to seal angel food cakes because it caused them to collapse. Difficulty was overcome by modifying the cake-batter formula, then sealing the cans under lower vacuum (22 in.).



**FULL PALLET LOADS** are easily moved by lift-truck into or out of sides and rear of trucks. Sliding doors provide quick access for full loads. Metal movable posts can be rearranged to suit requirements.

**WAREHOUSE "CUBE"** is efficiently utilized by stacking closely and up to three pallets high.

# One-Man Loading System

"Let George do it" is Coast brewer's simple-plus way . . . And even though taking just a "fellow and a forklift," it saves labor, costs, time

**FE STAFF**

Handling of case goods and kegs of beer may not be your business. But, any manufacturer with materials-handling problems well may profit from a study of this systematized method featuring use of newly designed truck bodies, since—

**▶ It enables one man with a lift-truck to load and unload a delivery truck in 15 min.**

**▶ And it saves valuable time in assembling and palletizing of cases and kegs.**

Yes, George—that is, George Fox, warehouseman at Portland (Ore.) Beer Distributors, Inc.—does the entire job of stripping and loading trucks. He handles seven trucks daily and has them ready to move within less than an hour's time.

The forklift truck has an 83-in. mast that permits stacking up to three pallets high in the warehouse and utilizing the "cube" space available. This is a stand-up type truck that allows the driver to get off and on it quickly—a decided advantage in order picking, also in most other lift-truck uses.

Special route trucks, with sliding doors giving maximum accessibility for loading and stripping, not only enable the warehouseman to speed his work but also make deliveries faster and easier for the routeman.

### How System Works

Cased beer arrives from the brewery on pallets, which subsequently are returned with cases of empty bottles. This warehouse does not have a loading dock. So, the driver of the transport must move the palletized cases, with hand lift-truck, to the rear of his truck, where the lift-truck picks them up and stores them.

Kegs are palletized (8 to a pallet) as they are unloaded from the transport. They are moved directly to a refrigerated room. These pallets belong to the distributor.

(*Turn to page 201*)

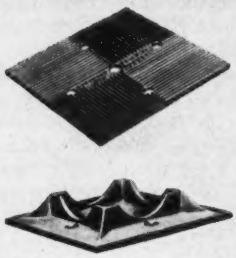
# Drehmann Floor Engineering Puts a Stop To Constant Replacement

**Is the vicious cycle of floor breakdown —patch—repair—tear-out—rebuild— slowing down production, piling up your overhead?**

Then, before more money goes down the drain, consult Drehmann, the most experienced floor contractor in the food field. Let this resourceful organization show you how your problem can be solved by converting to long-life, maintenance-saving Sani-Brick and Sani-Plate.

The ability of Drehmann installations to withstand food plant abuse is a matter of record. In plant after plant, floors laid by Drehmann twenty and more years ago are still in excellent condition—in spite of punishing treatment. No wonder Drehmann installations are the choice of every branch of the food industry—small, local processors as well as giant multi-unit organizations.

## DREHMANN SANI-PLATE



Heavy cast iron construction withstands abrasion, impact, constant moisture, corrosives, extreme heat and cold. Patented deep underside ribbing assures rigid, everlasting bond.

## DREHMANN SANI-BRICK

Handsome, natural red, vitrified. Made of finest materials in modern high-fired kilns. Extremely resistant to food plant corrosives and heavy trucking.

***THANKS TO*** PAINLESS CONVERSION —a highly successful installation method developed by Drehmann—you can operate at capacity while maintenance-saving Sani-Brick and Sani-Plate are laid right over your old worn floors. Ask a floor-wise Drehmann engineer to give you the details.

## DREHMANN DESIGNS • ENGINEERS • INSTALLS

**HERE ARE NINE IMPORTANT BENEFITS OF THIS COMPREHENSIVE FLOOR SERVICE**

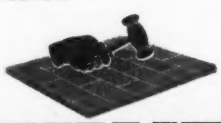
- HANDSOME APPEARANCE
- EASY TO CLEAN
- EXCELLENT SANITARY PROPERTIES
- RESISTANCE TO ACIDS AND ALKALIES
- EXTREME DURABILITY
- FAULTLESS DRAINAGE
- LOW COST MAINTENANCE
- FREEDOM FROM VERMIN
- LONG LIFE

*Write for Bulletin #A-1 "New Construction and Modernization."*

**DREHMANN PAVING & FLOORING CO.**

*Originator of Brick Floors—Est. 1869*

GAUL & TIOGA STREETS • PHILADELPHIA 34, PA.

DREHMANN HAS THE FLOOR  FOR MODERN INDUSTRY

**DREHMANN**

**—Floor Installations • Sani-Brick • Sani-Plate—**

**ON FULLY AUTOMATIC** line of Placentia (Calif.) Orange Growers Assn., corrugated shipping cases containing fresh-packed oranges are mechanically glued (center) and sealed in compression unit (right).

# Citrus Goes Corrugated

## Material, Labor, Freight Savings Chalked Up

## Produce Seen Moving Same Way

**FE STAFF**

Tests recently carried out on packing citrus fruits in corrugated shipping cases show great promise for slashing material costs and freight charges as well as for mechanizing otherwise-manual operations.

**▶ So successful have been these trials on citrus that produce packers, too, now are eyeing the possibility of adopting the new method. Lettuce, broccoli, and green tomatoes may, like oranges, lemons, and grapefruit be put up in the new pack.**

Advantages, in detail, are: (1) Savings in packaging materials through use of low-cost shipping cases in place of wooden boxes. (2) Less freight charges for the lighter cases. (3) Reduced production costs through installation of case gluer and sealer as well as other mechanized units. (4) Ease of handling and disposing in retail stores. And (5) better fruit, enabling wholesaler and retailer to get better prices.

Initial proving was carried out with several fruit growers on the West Coast. Typical was the investigation by Ventura Pacific Lemon Co., an affiliate of American Fruit Growers, Inc., Montalvo, Calif., with the cooperation of engineers from Standard-Knapp Division of Emhart Mfg. Co., Portland, Ore. Tried out were various types of shipping cases and case gluers and sealers designed to handle them.

In prior operations at Ventura, lemons were hand-selected, individually wrapped in tissue paper, and manually packed in a wooden box that was then nailed. Plant output amounted to 100 cases per min.

### New-Way Mechanization

Present method involves straight-through mechanical sorting and packing of the fruit, with the aid of mechanized vibrators, followed by automatic gluing and sealing of the cases.

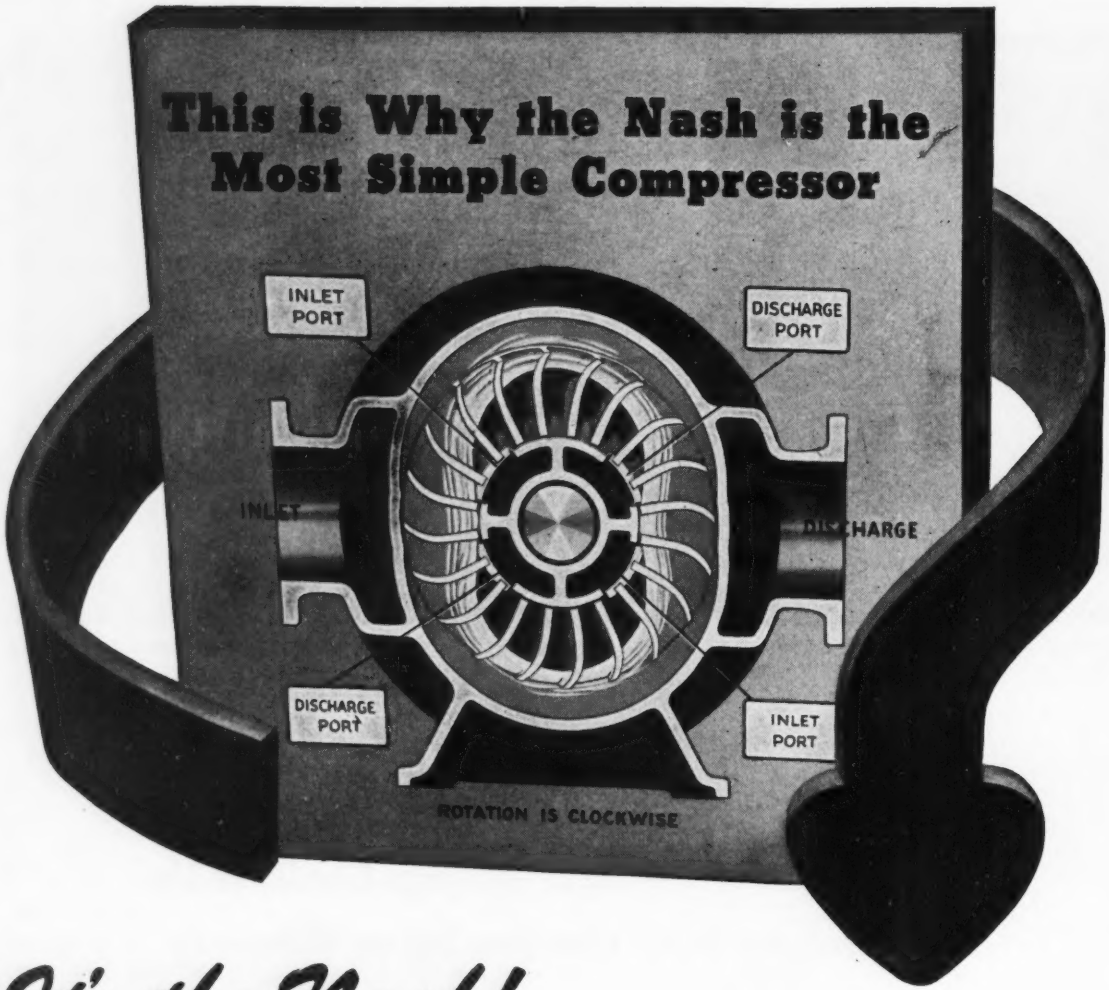
Standardization and economies were achieved by selecting a shipping case to meet all requirements. Finally chosen was a 40-lb.-capacity shipper (12x13x18 in.), with a conventional seal on bottom flaps and partially overlapping top flaps for greater strength.

To accomplish this, the equipment maker adapted one of its units for gluing and sealing top and bottom flaps. Big problem was to glue inner and outer flaps so that they would meet and to glue top flaps so that they would overlap. It is done by placing the shipping case on an angular roller bed that enables a slight opening of the flaps on the bottom so that a platen travels between them and permits the case and its load to ride on the platen.

Top and bottom flaps are folded into horizontal position. Rear flap is folded down by a kicker, and forward flap is folded under by a bull-nose. Both top and bottom flaps also are simultaneously skip-glued by cam-operated rollers. Skip-gluing assures easier opening and re-gluing of cases.

Cases leaving the gluer travel through a sealing-compression unit. Length of this unit varies according to type of glue and case as well as the required speed. It is noteworthy that a corrugated case does not require a compression unit as long as one for the solid-fiber case. Average speed of case gluer and sealer is 16 cases per minute. (Turn to page 136)

# This is Why the Nash is the Most Simple Compressor




# *It's the Nash!*

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

**No internal wearing parts.**

**No valves, pistons, or vanes.**

**No internal lubrication.**

**Low maintenance cost.**

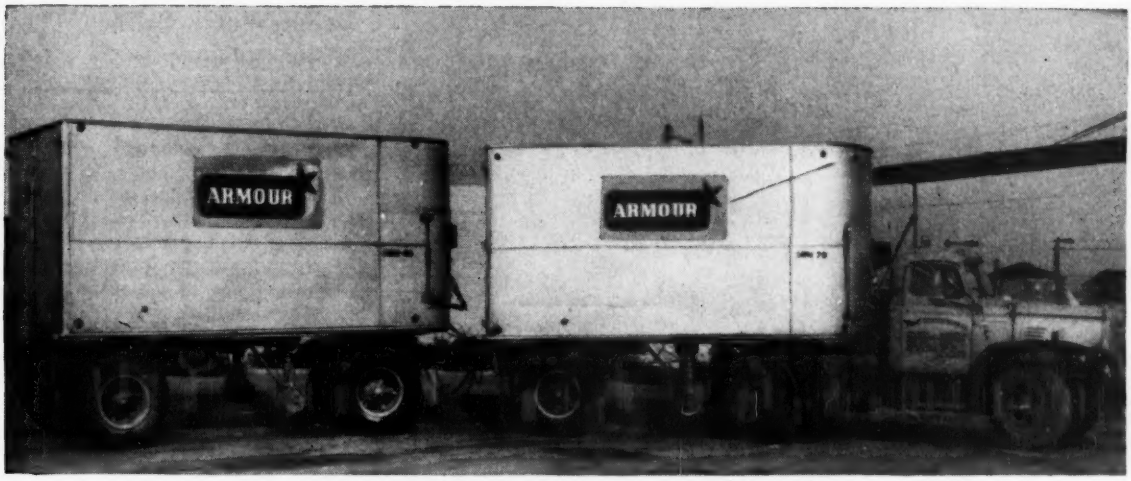
**Saves floor space.**

**Desired delivery temperature automatically maintained.**

**Slugs of liquid entering pump will do no harm.**

**75 pounds in a single stage.**

**NASH ENGINEERING COMPANY**
**313 WILSON, SO. NORWALK, CONN.**




**Versatile Train That Speeds Distribution, Insures Quality, Cuts Shipping Costs**

**ROLLING** in 175-mile radius from Chicago packing plant, it's readily broken into separate units at whatever area-point is most strategic for covering the day's specific delivery demands.

# Trailers Double as Route Trucks

## Their Combined Distant-Local Service Eliminates Re-Handling

FASTER customer service, better product-quality protection, and reduced shipping costs are advantages cited for an unusual product handling operation developed by Armour and Company, Chicago.

Employing over-the-road vehicles for movement of meat products, the system functions in dual performance to eliminate the use of rail transportation and also to serve local-delivery needs.

Further, this new operation has completely done away with the former product re-handling enroute, thus banishing the product-waste attendant on breaking the continuity of refrigeration.

### How New Betters Old

This service carries on over a route pioneered 60 yr. ago. From the Chicago plant, products used to be shipped via rail refrigerator cars to the start of the local delivery route at South Bend, Ind.

To transfer products from the rail cars to trucks at the break-bulk point necessitated a permanent dock alongside the tracks. Here the products were unloaded, assembled into orders, and reloaded into local delivery trucks.

Requiring one handling of the entire shipment, this delayed the delivery trucks until the orders were properly assembled and finally loaded. And during the transfer the products were removed from refrigeration.

But in the new automotive operation, the products are loaded at Chicago into two separate vehicles instead of into one railroad car. These vehicles are semi-trailers formed into a double-bottom trailer train (see photo), one trailer being pulled behind the other. The front of the rear trailer is supported by a removable set of dolly wheels and axle; it attaches to the forward trailer by a standard drawbar connector. The forward trailer is supported by a hauling tractor.

Each trailer carries a complete route-delivery load already arranged in proper distribution sequence. Thus, when the vehicle train reaches the designated South Bend break-bulk point, the trailers are detached and stand ready as delivery-route units, needing only tractors to pull them.

The train is separated by withdrawing the road tractor and dropping the front trailer onto its landing-gear, then disconnecting the rear trailer, removing its dolly wheels, and resting it on its landing wheels. Next, two delivery-route tractors supplied from the South Bend Armour branch are backed up under the trailers, and they are immediately off on their delivery routes. Meanwhile the road tractor stands idle.

For real efficiency, it is necessary for the road train to reach the break-bulk point by the time the delivery tractors are scheduled to leave on their routes. This is accomplished by dispatching the road train 4 hr. earlier from the Chicago plant to assure arrival at the break-bulk point at South Bend, some 100 miles east, before the tractors are due to go out.

In this entire operation no order-sorting platform is necessary, no handling of the products is required, and the loads remain under continuous refrigeration, there being no need to open doors of the trailers at any time.

Another advantage: With no call for a sorting platform, the break-bulk point can be re-located at will to suit the changing route requirements. All that is needed is a parking area where the road train may be broken up and the trailers picked up by the tractors for the deliveries in the northern Indiana territory.

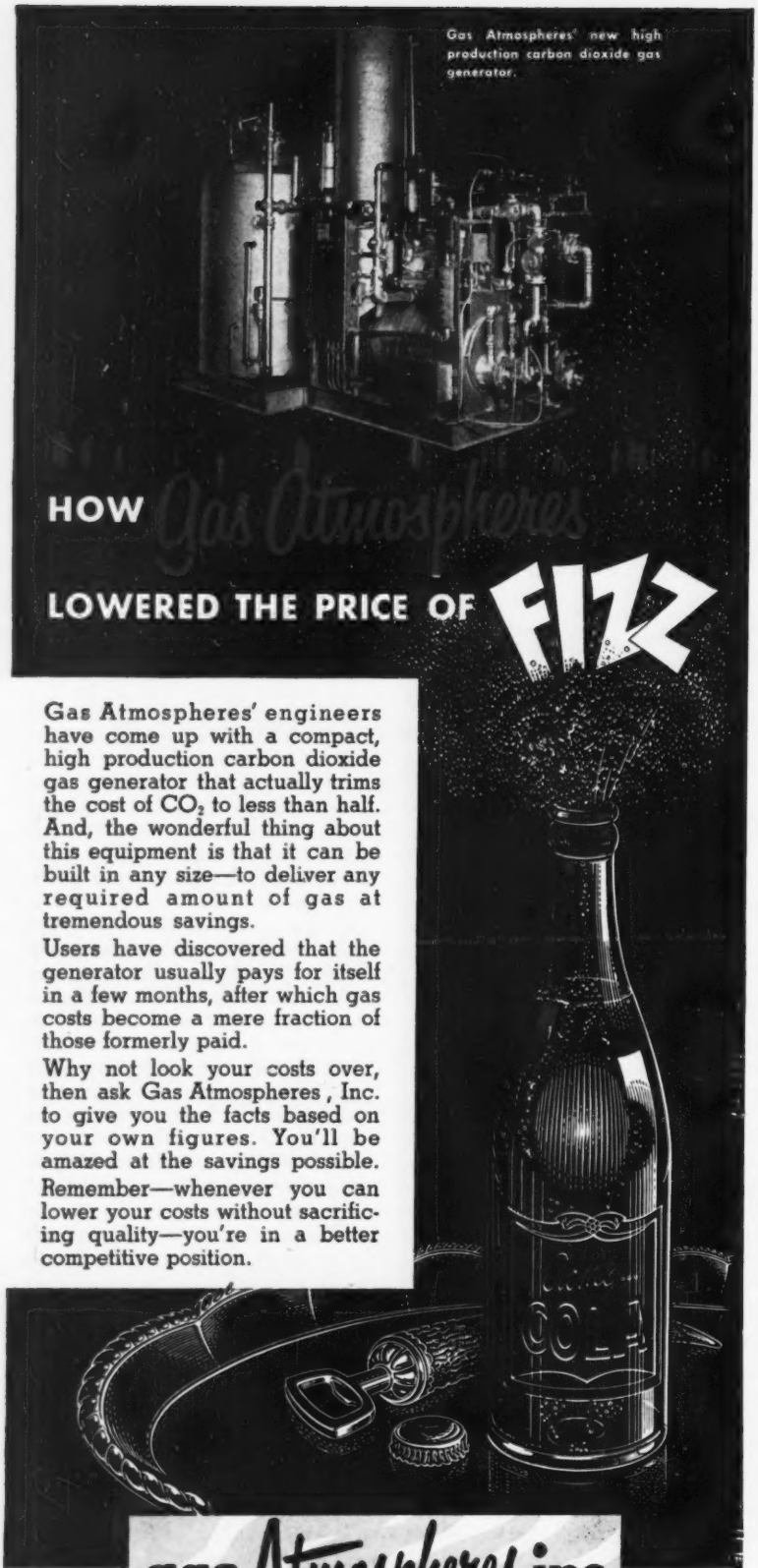
### Vary Day to Day

In this large area routes are not the same every day. Thus, while the break-bulk point may be centrally located for trips on Mondays, it may be re-spotted another day—to save as much as 50 miles extra traveling.

At present Armour believes that this road train is effective where break-bulk points are no farther than 175 miles from the plant. The company is planning to add more such trains within this radius.

In so doing, as H. O. Mathews, general manager of the Transportation

(*Turn to page 147*)


Gas Atmospheres' new high production carbon dioxide gas generator.
HOW Gas Atmospheres
LOWERED THE PRICE OF FIZZ
Gas Atmospheres' engineers have come up with a compact, high production carbon dioxide gas generator that actually trims the cost of $CO_2$ to less than half. And, the wonderful thing about this equipment is that it can be built in any size—to deliver any required amount of gas at tremendous savings.
Users have discovered that the generator usually pays for itself in a few months, after which gas costs become a mere fraction of those formerly paid.
Why not look your costs over, then ask Gas Atmospheres, Inc. to give you the facts based on your own figures. You'll be amazed at the savings possible.
Remember—whenever you can lower your costs without sacrificing quality—you're in a better competitive position.
gas Atmospheres, inc
equipment for producing industrial gases
CLEVELAND 14, OHIO

## Boiler-Water Solids

—*Continued from page 82*

samples or can be installed to make continuous measurement. For the latter, values either may be recorded or simply used to operate warning devices to indicate when objectionable carryover is taking place.

In using this equipment representative sampling of the steam or condensate is essential. In sampling steam, there should be used a nozzle following the design recommended by the A.S.M.E. For taking spot samples, a simple cooling coil is sufficient.

A continuous record of conductivity calls for a condenser that will eliminate nearly all of the carbon dioxide and ammonia present in most plants from the steam. In solution, these gases contribute to the condensed steam some conductivity that is not due to carryover. Hence, it is necessary either to eliminate the gases before making the measurement or to make a suitable correction by analyzing for the amount of carbon dioxide and ammonia present.

From the preceding, it is evident there are a number of possible solutions to carryover problems. What is best for any particular plant will depend upon numerous factors, including cost, interruption of operation, and length of time to make the necessary changes. Use of anti-foam agents frequently will provide a permanent solution.

### Mr. Blumenshine on Priming—

Violent ebulition of the water within the boiler may arise from any of the following causes:

(1) Boiler design, (2) overloads, (3) incorrect and varying water level in boiler, (4) undersized steam mains, or (5) sudden and violent steam demands.

Peculiarities of design cause some boilers to produce an unusual turbulence when a material evaporative increase is demanded. This accentuates possibilities of priming or surging. It is sometimes possible to install baffles to minimize such turbulence.

Overload problems generally can be handled only in two ways: Reduction of overload or adding boiler capacity. The first way usually is impossible in our canning plants where production has overtaken steam-generating capacity. The second is costly and, with a short seasonal operation such as many canners have, the additional investment cannot be fully justified.

In such instances a thorough survey of existing facilities should be made. Depending upon their type,

boilers are constructed to deliver up to as much as 200% of their rated capacities. Through equipment changes that are not too costly, along with revision and coordination of operating practices, a considerable boost in generating capacity can be obtained.

Constant water level is an important factor for good boiler operation and minimizing of priming. If it can be justified, automatic equipment generally will give very satisfactory results.

A major cause of priming are steam mains that previously were very ample, but which, due to increased steam demand, now are causing such increased velocities in the steam leaving your boilers that they literally suck the water from them. Increasing the size of mains leaving boilers can be most beneficial.

It takes no unusual imagination to picture what takes place in a boiler having outgoing steam mains that are only the very allowable minimum in diameter, yet is running considerable above its rating—say, when your retort room slaps on a couple of retorts simultaneously, your syrup man starts heating up a couple of tanks of syrup, and about three blancher temperature controls suddenly call for full steam supply. Is it any wonder you get priming? The remedy, of course, lies in management's hands.

### Traps and Drip Legs

Continuing on into the factory proper, all steam mains should be adequately trapped at frequent points to take care of condensate. Where water carryover occurs, it helps to install drip legs. If judiciously placed where steam mains change elevation or direction, they will collect a major portion of the solids that tend to travel along the bottom of the mains.

Such legs should be trapped at a reasonable distance above their lower end and fitted with a direct blow-through valve at the bottom. In one plant where detinning marketing of cans was experienced, carryover material having a pH above 12 was collected in such drip legs.

Steam feed mains in retort rooms should be given special attention where there is detinning or white deposits on cans. Each main feeder line should be fitted with drip leg and trap at its lowest end. All leads to retorts should be taken from the top of feeder main. This is a very important point in combatting such troubles. The role of boiler room personnel also is important. An alert, well posted and conscientious crew can do much to minimize trouble.

To meet the varying boiler loads requires constant and intelligent attention to fuel supply, proper draft regulation or control of air supply, water level in boiler, and proper timing of cleaning fires if coal is the fuel. Blowdown schedules must be adhered to strictly and all records kept up to date and accurately.

*End* (*Resume reading on page 83*)

## Apple Juice Powder

—*Continued from page 79*

190 F. And at the start of the foaming stage, the platen water temperature was gradually reduced to 165 F. to bring the concentrate temperature back to 160 F. and maintain it there.

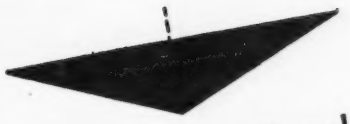
At the end of drying proper, the product was molten. It was cooled by circulating cold water through the platens while maintaining the vacuum on the dryer. When the product reached 90 F., the dryer was opened and the pans removed. At this temperature the product was brittle. It was taken out by inverting the pans and tapping the bottoms briskly, whereupon the glass-like material fractured and dropped in pieces. These pieces, placed in a dried bottle containing desiccant envelopes, were ready for grinding and packaging.

*Grinding:* When its moisture was less than about 3%, the dried material was friable and could be readily comminuted if the ambient temperature was below about 90 F. At higher temperatures the material became increasingly plastic so that it could not be ground in the hammer mill. An atmosphere of relative humidity below 15% was necessary during all processing steps to prevent the highly hygroscopic dried product from rehydrating.

Under favorable conditions of temperature and relative humidity, the material was ground to coarse granular particles with no product retained on a 10-mesh screen (0.065-in. opening). Particle size ranged in distribution from fine powder up to the size just passing through a 10-mesh screen. Percent of fine particles was kept low because caking of the powder probably is a function of particle-size distribution, with high percentage of fines increasing the likelihood of agglomeration.

Coarser particles and fewer fines were obtained when using slower mill speeds and coarser screens. The powder did not cake when thus ground.

*Packaging:* The powdered juice product was hermetically sealed in number 202 x 214 cans. Each can carried an envelope containing a desiccant.[3, 4, 5] Weight of desiccant (anhydrous calcium oxide) was about $\frac{1}{10}$th the weight of the powder.

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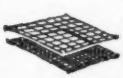
Supplies of many of the most frequently used types of industrial wire cloth are kept in our warehouse ready for immediate shipment to you. And even if the type you use is not in stock, we can schedule our looms to have your material in your plant without delay. Any metal or alloy; sizes range from 20 x 250 mesh up to 4" openings . . . and accurate mesh count is our pride.

also FABRICATED PARTS



Filter leaves, strainers, sizing screens, etc. We can fabricate most any type of part you need, in any quantity. We'll work from your own prints or, if none are available, our Engineering Department will draw up prints from your description of what the part must do. Once you've O.K.'d them, we'll start production.

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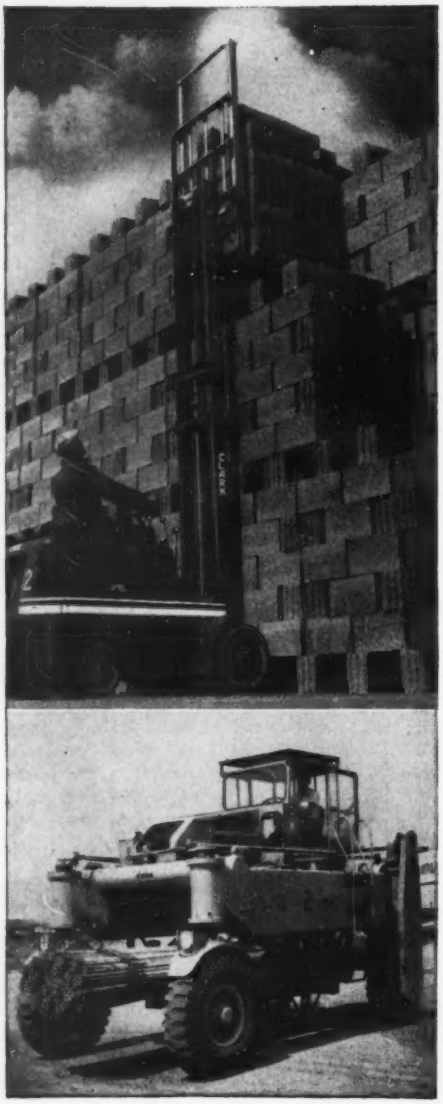
OFFICES IN LEADING INDUSTRIAL AREAS



**NO CAPITAL INVESTMENT for your material handling costs when you use CLARK'S PAY-AS-YOU-GO LEASE PLAN**

Without tying up a penny of working capital, put Clark material handling equipment to work for you. With Clark's pay-as-you-go plan, any of Clark's many models and types of handling equipment is available for your immediate use. With no down payment and at a low monthly cost, this lease plan enables you to:

1 Conserve working capital for other essential needs—such as additional inventory, plant expansion and non-leasable capital equipment.

2 Pay-as-you-go rental is totally deductible expense.

3 Eliminate trade-in problems and get the benefit of newest equipment.

No outside financing is necessary—you deal directly with your local Clark dealer who will help you determine what equipment best fits your needs. Gas or electric fork trucks, Powrworker hand trucks, tractors and Clark-Ross carriers—all are available on a 3 or 5 year lease.

Let Clark equipment pay for itself as it cuts your handling costs. Call your local Clark dealer for a discussion of the details which will not obligate you in any way.

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

*SEE THE YELLOW PAGES OF YOUR PHONE BOOK FOR THE NAME OF YOUR LOCAL CLARK DEALER*


A comprehensive study of the storage properties of this apple product is in progress. Concentrate similar to the starting material for drying has maintained good flavor after 9 months storage at room temperature (73 deg. F.). The powdered material, with its extremely low moisture content, is expected to have good keeping properties even at elevated temperatures. Until storage tests are completed, however, the process is not recommended for commercial adoption.

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*End (Resume reading on page 80)*

## Air-Operated Rolls

*—Continued from page 83*

ever, in the new mills the rolls automatically open before such foreign materials can injure them. Meanwhile, flow of grain or middlings being milled is interrupted until the damaging object is past. Then the rolls automatically reset and the milling process continues.

Advantages gained in this installation over line-shaft driven rolls:

**1. Addition of nine stands of rolls in a limited space.**

**2. Approval of the layout by the Province Department of Codes, thus saving mill management the need of an attendant when starting these units. This approval was based on automatic features of the mill and the interlock, connected to the main starting motor.**

**3. Elimination of line shaft and pulleys over the stands of rolls on present roll floor.**

**4. Freedom from insect infestation, since stock-flow dead spots are abolished by lively movement of stock over the new vibrating feeder.**

The nine stands of pneumatic mills were installed to grind fine and coarse sizings; fine and coarse 1 midds; fine 2, 3, 4, and 5 midds; and quality stocks.

The excellent grinding was confirmed by actual operation. For example, the 5-midds rolls were operated 4 hr. with no hand-wheel adjustment and with 44 lb. of air on dial. As long as air pressure remained constant, there was no changing of the grind.

*End (Resume reading on page 84)*

# TRUMP CARDS
## for food processors

Throughout the food processing industry, materials handling problems are being solved through application of equipment once considered strictly for bakery use. Our list of customers tells us that more and more food processors throughout the industry are turning to Read Standard for an "ace in the hole" when a materials handling problem has them stymied.

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# When the FLAVOR is there -the Customers are too!

## Magnify Natural Food Flavor as More and More Leading Food Processors Do . . . with Zest

Your brand will be their favorite if you use *Zest* to produce more satisfying, tastier products. This miracle seasoning—pure Monosodium Glutamate—intensifies natural flavor *already in* canned foods, without adding flavor, aroma or color of its own. Low cost *Zest* is effective in tiny amounts, added either before, during or after processing. Use it in canned soups, fish, stews, vegetables, meats, poultry . . . and scores of other foods. Boosting food flavor with *Zest* is a proven method of increasing volume sales in both canned and frozen foods. Write today for all the details about profit-making *Zest!*

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**Staley's 99+% Pure Monosodium Glutamate**

**A. E. Staley Mfg. Co., Decatur, Illinois**

**OTHER QUALITY STALEY PRODUCTS FOR FOOD PROCESSORS**

**SWEETOSE®**—enzyme-converted sweetener for firmer texture, better flavor

**Sta-Sol®**—lecithin concentrate gives more complete mixing, prolongs shelf life

**Staley's C. S. U.**—High quality standard corn syrup

## Toughens Bottles

—*Continued from page 121*

7.2 for the siliconed bottles and 51.0 for the untreated.

Average heel impact strength was 93.7 in. per sec. for siliconed vs. 81.1% for untreated bottles—a 15.5% increase. Similarly, hydrostatic pressure strength was termed improved. Average strength for siliconed bottles was 237 psi. (origin position was changed from sidewall to heel as sidewall abrasion was eliminated) and 185 psi. for untreated bottles.

Brockway cites these properties as reflecting improved ability of siliconed bottles (liquid-filled) in withstanding handling shocks during warehousing and shipping. Experience of the same food packer indicated improved performance of siliconed juice-filled bottles.

For example, only four cases out of over 22,600 shipped to all parts of the country were reported damaged in transit. Loss rate in this case was only 0.017%, compared to the common range of ½-1%.

Inasmuch as silicone films are water repellent, not adherent to many materials, difficulty may be encountered when using water-soluble adhesives during labeling operations. Some experience, however, has been obtained with adhesives* that stick to silicone-treated surfaces. In addition, certain gummed papers** also will adhere to siliconed surfaces.

Studies were made by GE on the material costs for applying silicone to ware in the cool end of the annealing lehr. In the case of 5-oz. baby-food jars, cost of required silicone (12 grams) runs between ½ and 1c. per gross. Costs for other size containers were roughly proportional, according to surface area of the jars.

### Re Toxicity

Since amount of silicone applied to glass containers is extremely small, toxic effects that might occur are minimized. Silicone fluids and materials have been submitted to animal tests. These tests included chronic and acute toxicity feedings. All tests indicated a very low order of toxicity.

The silicone SM-70 was diluted to 1% silicone and this fluid substituted for drinking water of test rats for four weeks. No toxic manifestations were noted when the rats were compared with those of a control group.

FDA officials published articles in

* "Glas-Bond S-189, S-353, and S-342, Polymer Industries, Inc., Springdale, Conn.
** Trojan Metalite No. 621 and 665, Gummed Products, Troy, Ohio. Perfection No. 360, Paper Manufacturers Co., Philadelphia.

Whether you have a new concrete floor or are refinishing an old one, the Multi-Clean Method is fast and economical. It fortifies concrete against abrasion and the devastating effects of excessive water, grease, oils, alkali, soaps and other chemicals. It prevents concrete dusting, pitting and chipping . . . gives you a hardened, completely sealed floor in a wide range of permanent non-fading colors and natural. You'll get better service and greater safety with added beauty and longer life from your concrete flooring when you use The Multi-Clean Method.

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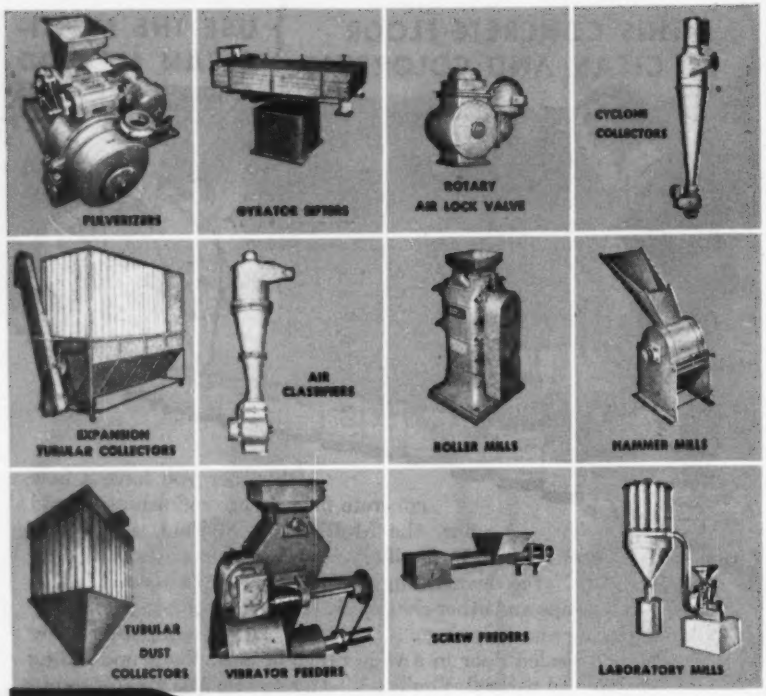


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the *Bulletin of the Association of Food & Drug Officials of the U. S.* (July '50 and July 51) discussing the use of silicones in certain food processing operations—anti-foam use, release of bread from pans coated with cured silicone resin, and release of candy from silicone resin-coated pans. Outlined, in detail were conditions of these uses.

### Applying to Glass

It has been found most desirable to spray diluted SM-70 emulsion into the annealing lehr. The SM-70 is diluted with water in the range of ½% silicone content (99 parts water and 1 part SM-70) to 1% content (49 parts water and 1 part SM-70). Water must be low in mineral content to prevent deposition of salts on the glass and lehr equipment.

Atomizer spray heads of the air-pressure (30-40 psi.) type are installed in the lehr—at the point where temperature of ware is 350-450 deg. F. Set-up assures misting of entire width of the belt with a rain of fine droplets. Thermal shock to the ware is avoided by permitting droplets to fall some distance so that some of the water vaporizes prior to contact.

*End (Resume reading on page 123)*

## Citrus Goes Corrugated

*—Continued from page 127*

Tare weight of the new case is about 2 lb. (or a little more than 4 lb. for the two units), compared to 7½ lb. for the wooden box. This weight saving is estimated to mean a difference in freight cost of about 6c. per standard wooden box.

Cost of the new shipping case is about 21c., whereas the wooden one is about 76c.—or a 34c. savings in the replacement. The new packing method also abolishes need for individual wrapping of fruits, which saves considerable material and labor.

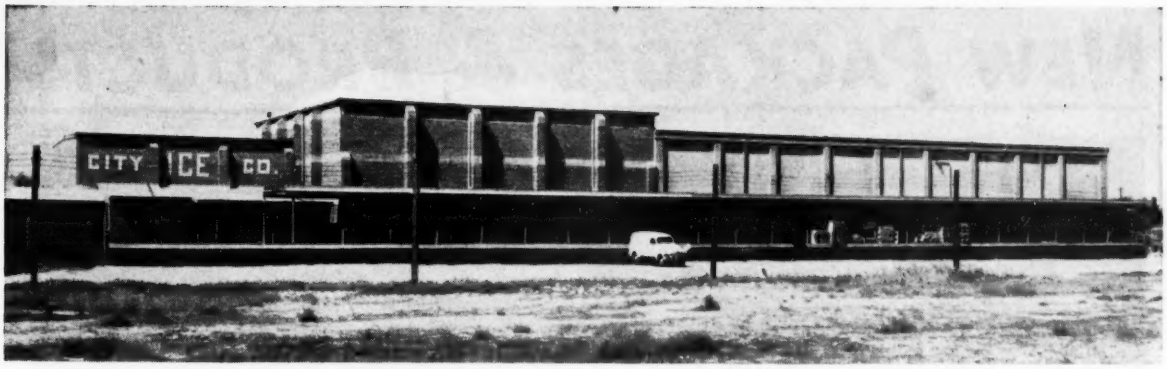
Estimated cost of packing and sealing the new corrugated shipper is about 6c. per standard box, as compared to approximately 25c. for the wooden box—a savings of 19c.

Added to the 59c. thus saved (6c. plus 34c. plus 19c) are other marginal benefits, such as less refrigeration requirements, expected to reduce costs about 71c. per standard box.

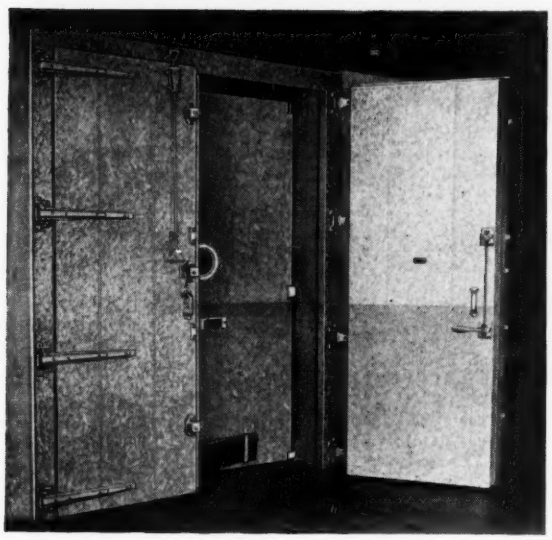
Fruit is reported to arrive in better condition, thus frequently commanding a premium from 25-50c. per standard box at auctions.

The new cartons are easier to handle in retail stores. And the empties have re-use value—groceries can be packed in them for carry-home purposes.

*End (Resume reading on page 129)*




# Modern Ideas in CITY ICE COMPANY Warehouse Include JAMISON Lo-Temp Doors

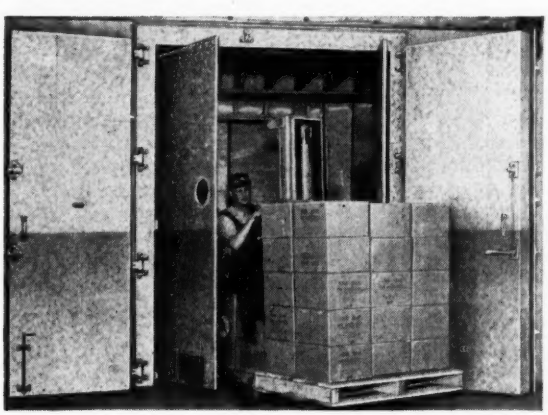


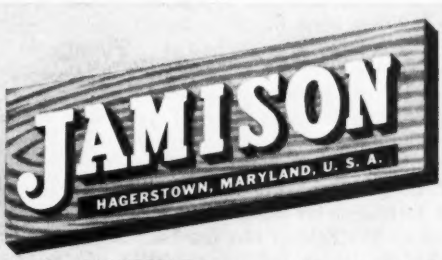
**Light In Weight, Lo-Temp Doors** are easy to open or close. Metal cladding, combined with the kick plates on the back, adds further to the strength of the doors and enables them to withstand constant battering.

Efficiency typifies the modern City Ice Company warehouse in Denver. It's evident in the latest tip-up type of wall construction . . . and in the three Lo-Temp Double Vestibule Doors which are used for frozen food storage at —15° to —20°F.

Opening off the loading dock, these metal-clad infitting doors maintain a tight seal and provide ample insulation no matter what the outside temperature. Because of their large size, the doors also speed handling by giving lots of clearance for loaded fork lift trucks. An extra set of Auto-Close Doors forms an air lock behind the Double Vestibule Doors to minimize cold loss during handling.

For additional information about cooler or freezer doors, consult your architect or write to Jamison Cold Storage Door Company, Hagerstown, Maryland, U.S.A.






*More* JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.



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# NEW PACKAGES & PRODUCTS

**WIDESPREAD ACCEPTANCE** of cans for soft drinks is evident in the large number of brands illustrated above. Back Row: Shasta, Tap-a-Cola, Bev-Rich, Export (Ottawa), Bala Club, Donald Duck, Belfast, and Can-o-Pop. Second Row: White Rock, Canada Dry, and Mission Dry. In foreground is Pepsi-Cola, and Cantrell & Cochrane's Super Coola. The Super Coola cans shown are 12-oz. can with recently redesigned label, 6-oz. size, and 12-oz. can with former label.

## Pop Processors Swing to Cans

### Some use flat-top, others crown type

Skyrocketing popularity of canned soft drinks among bottlers and retailers is revealed by the large number of major soft drink bottlers who have either made the canned pop an integral part of their production, or who have begun market testing their product in cans.

Cantrell and Cochrane, Englewood, New Jersey, sparked the current trend with introduction of their Super Coola in 6- and 12-oz. crown-top cans designed by Continental Can Co. Recently revised for more eye appeal, the Super line has been the first canned pop to take hold.

Fast on the heels of Cantrell and Cochrane have been processors like Pabst Brewing Co.'s Hoffman Division, White Rock, Canada Dry, Mission, Golden Age Shasta, Can-a-Pop, Bala Club, and Donald Duck, to name a few. Preference for either the crown-top can or the flat-top can has been split evenly. In the last few months however, the higher cost of the crown top has resulted in more converts to the flat topped can.

Pepsi-Cola, an early experimenter in the field, is at present canning its product at a plant in Alton, Ill. Here the problem of shelf life is yet to be fully solved, present distribution being made only to a fast moving retailer.

#### Dietetic Pop

Noteworthy among the myriad of colas is the recently marketed Tap-a-Cola, which is produced in two versions; an "extra dry" and a dietetic version boasting only three calories.

Four of the major can suppliers, Continental Can Co., American Can Co., Crown Can Co., and Pacific Can Co., have predicted a lucrative future for themselves in supplying the containers for the new field. American Can Co. has predicted that production of pop cans will eventually be double the present production of beer cans.

All of the suppliers have tackled the serious problem of canning carbonated beverages with a will. The answer has generally been a heavier can lined with plastic.

Latest entry is Mission Dry's quart-size, crown-top can, made by Continental Can Co., being test marketed in New York.

The cans have been utilized for all soft drink flavors, and extended to the ginger ale and club soda products. Consumer acceptance has been cautious as it has been with other innovations in food packaging and processing. Beer canners have particularly taken the new idea to heart, since they already have the necessary equipment.

A fast and growing trend, the canned soda pop field is now nationwide, and has already extended beyond to Canada, where Pure Spring Co., Ottawa, has marketed ginger ale in crown-top cans. Generally can labels have retained the features evident on the bottled pop.

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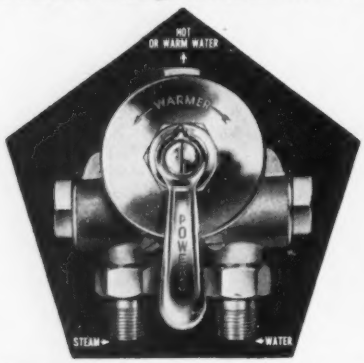


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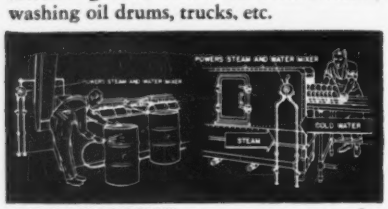

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Please Send Bulletin 369.

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## Rolled Aluminum Container

Borden Co., is test marketing its cheese spread line in a series of color rolled aluminum containers with vacuum sealed caps. The five varieties of processed cheese spreads, garlic, olive and pimento, Smokey, Vera-Sharp, and American, are appearing in 6-oz. containers of silver, ruby, turquoise, emerald, topaz, aquamarine, gold, amethyst, yellow sapphire, mandarin red, blue sapphire, and bronze.

Manufactured by Basca Mfg. Co., Indianapolis, the containers are sealed with a vapor-vacuum pry-off closure designed by White Cap Co., Chicago.

A similar aluminum tumbler for jams and jellies is being produced by Reynolds Metals Co., Louisville, Ky. The anodyzed aluminum containers are available in 5- and 10-oz. sizes, in ten colors.

**For Package Data Use Reader Service Card**

## King-Size Carton

Designed for Bond Bread Division of General Baking Co., New York, is a king-size carry-home carton that holds six full sized loaves of bread. Manufactured by Atlanta Paper Co., Atlanta, Ga., the carton is similar in design to that used for soft drink bottles.

As used for promotional purposes in South Carolina, the carton was filled with an assortment of bread, including the sandwich loaf, old fashioned loaf, and the large family loaf.

**For Package Data Use Reader Service Card**

## Non-Refrigerated Pies

A line of canned pies that may be kept indefinitely without refrigeration has been announced by Wilson & Co., Inc., Chicago. The result of a process called Pan Pac, the pies are presently being produced in beef and turkey flavors, with others planned.

The pies are to be marketed under a new trade name, Jane Wilson.

## Canned Bacon Rinds

Filler Products, Inc., Atlanta, Ga., is processing fried bacon rinds in four flavors—plain, cheese, garlic and onion. Packed in key-opening, vacuum pack cans by American Can Co., the product is recommended for beverages and soups, as well as for snacks.

The label is lithographed on the can and carries a reproduction of the contents with brand identification.

**For Package Data Use Reader Service Card**

## Ready-to-Eat Ham

Packed in a perforated artificial casing is a lean, fully-cooked, round, boneless ham, introduced by Swift & Co., Chicago. The new ham is packed in 6-8-lb., 8-10-lb., 10-12-lb., and 12-14-lb. sizes under the Premium trademark.

A uniform diameter of the product and elimination of juice pockets is insured by a casing which will not stretch.

The ham may be merchandised "as is" as a sliced sandwich ham, or breakfast-sliced and prepackaged for the self-service counter.

### Frozen Soups Make Debut

The Campbell Kids play a prominent part in the labels of Campbell Soup Co.'s new frozen soup line. Created by industrial designers Lipincott & Margulies, the label features a horizontal layout, designed to follow the practice of stacking frozen food cans horizontally in store freezer displays. The horizontal label will serve as a quick means of distinguishing between the frozen and regular soups. The processor is currently test-marketing oyster stew, cream of shrimp, and green pea with ham frozen soups.

### Frozen and Frizzled

Silver Bell Food Corp., Philadelphia, has introduced a ready-prepared, fresh-frozen, creamed, frizzled beef. Marking the processors entrance into the frozen food field, the beef is prepared with fresh milk and butter.

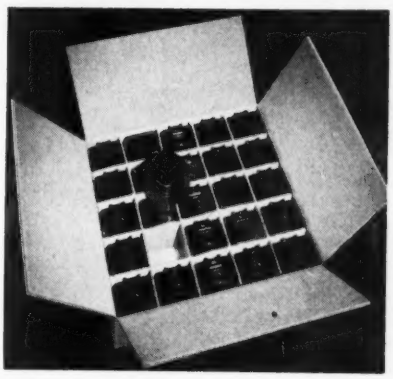
It is packaged in an outer wrapping of aluminum for protection, and then packed in a foil container which serves as a heating and serving dish.

### Wrap Sparks Sales

A reported jump of 30% in sales is said to be the result of Rogay Food Co.'s new package for salt mackeral fillets packed in brine. Manufactured by Continental Can Co.'s Shellmar-Betner Div., the package is a strong compound of reverse-printed cellophane laminated to heavy Pliofilm.

Windows, a fish outline on one side, a sail boat on the other allow easy product identification and inspection.

CREATE **INTEREST**



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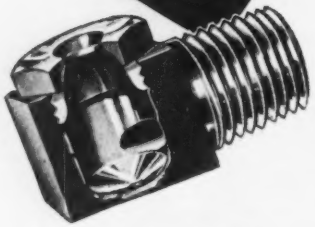

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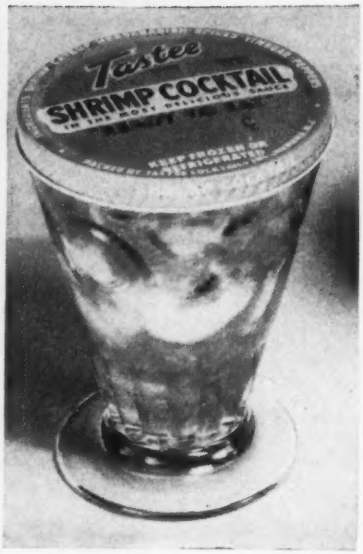



## Ready-to-Serve Appetizer

Vacuum-packed shrimp in cocktail sauce may be served in its attractive container once the cap is removed. Processed by Tastee Cocktails, Inc., Newark, N. J. the product is reported to have gained increased impulse sales since the standard design jar was discarded. An added feature is a depressed channel in the cap, permitting easy stacking. The shrimp cocktail is kept frozen or refrigerated until used.

## New Cocktail Spread

Recently introduced by Stahl-Meyer, Inc., New York, is a 3¼-oz. can of bacon spread, made from Ferris bacon, pork, onions and spices. The spread is a companion item to Stahl-Meyers' other spreads: liverwurst, ham, corned beef, and tongue. The spread may be used on canapes, sandwiches, stuffed tomatoes and omelets. The label features the "instant" advantage of the spread.

## Poly-Packed Radishes

A polyethylene wrap for radishes has boosted sales in self-service supermarkets. Topped in the field, the radishes are washed and packaged on a mechanized line.

Unwrapped radishes were unpopular with consumers because of necessity of keeping them moist in fresh vegetable display troughs. New wrap keeps radishes fresh but dry.

## Old-Fashioned New Product

Port Stockton Sausage Co., Stockton, Calif., is processing Old Fashioned Brand Breakfast Sausage in a 1-lb. cellophane bag. Designed by Milprint, Inc., Milwaukee, the bright yellow cellophane bag holds a printed blue and white vignette of a "gay nineties" lady preparing food on an old fashioned range, contributing to the "old fashioned" motif. Product identification and brand are printed in red and blue letters.

Back panel contains recipes for products. Ingredients include pork, beef, pork fat, water, salt, and flavoring, with cereal added.

**For Package Data Use Reader Service Card**

## Fruit Product Debuts

Being test marketed by Welch's Grape Juice Co. is Fruit of the Vine, a preserve of Concord grapes. The product is packed in a glass jar designed to serve as a fruit cup. With lid removed, the product is ready to serve. The jar also offers a reuse value.

### Properly Opened Closures

Disturbed by effects of standard can openers on their vacuum caps, White Cap Co. has undertaken the supplying of a specially designed opener to housewives. An early model was attached to the side or cap of jars with vacuum caps. Shown in foreground above is the new opener, to be distributed through retailers. The opener is specifically designed for proper opening of vacuum caps.

**For Package Data Use Reader Service Card**

## Fruit Cereal Marketed

Latest entrant in the ready-to-eat breakfast cereal field is General Mills' Trix, a pre-sweetened cereal in raspberry, orange, and lemon. Flavored with real fruit favor, the cereal is colored to match the flavor.

All exposed surfaces of the carton carry a reproduction of the contents.

## New Product Shorts

**Beef for Breakfast**

An all-beef link breakfast sausage has been developed and marketed by Sigman Meat Co., Denver, Colo. The sausage, selling for less than pork, is made of choice ground beef.

**Canned and Creamed**

Carnation Co. is marketing canned creamed tuna, ready to heat and serve, as an addition to the canned milk line.

**Novelty Containers**

Swift & Co.'s new 11-oz. jar of peanut butter will feature a "Wizard of Oz" motif. Colorfully imprinted with six characters, the jars are designed for use as novelty glassware after product is used.

**Brittle Cookies**

Burry Biscuit Corp., Elizabeth, N. J., is marketing peanut brittle cookies in a 9-oz. box. Ingredients include peanuts, peanut butter, and ground peanut brittle.

**Bagged Apple Slices**

Directed at apple pie bakers is a 20-oz. polyethylene bag of peeled and sliced apples. Goldman Foods, Inc., is the processor.

**Linked Cheese**

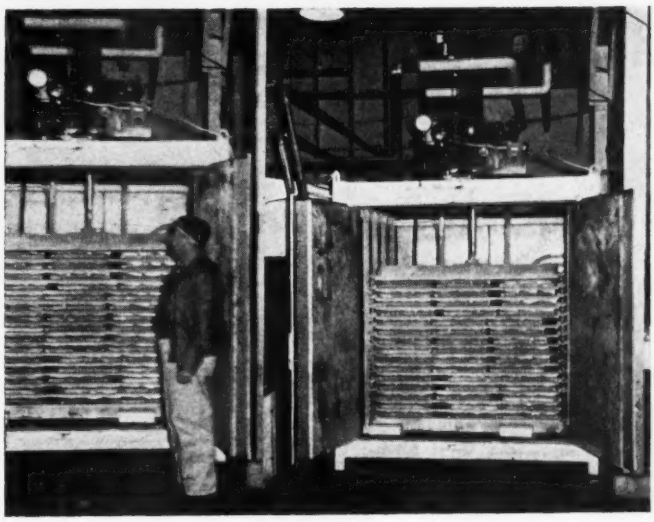
Swiss "handy-snack" has been added to Kraft Foods Co.'s line of pasteurized process cheese links.


# AMERIO Double Contact Pressure Plate Freezers

**(U. S. Pat. No. 2,608,069)**

(Canadian Pat. No. 494,746)

## LEAD The FIELD—they Assure Uniformly Frozen Products!



**The Amerio hydraulically controlled plates with top and bottom pressure contacts give uniform freezing throughout.**

**You always get flat, uniform packages for stable stacking and great eye appeal.**

**The sharp fast freezing assures full flavor and quality retention.**

**Continuous high production with uninterrupted operation means utmost simplicity.**

**Outstanding Amerio Economy means lower power consumption per pound of product; maintenance costs are negligible; cleaning time reduced.**

## For Best Results

**Always Use AMERIO CONTACT PLATE FREEZERS for Your Packaged Products.**

## Call or Write Direct

FOR DETAILS ABOUT THE MANY ADVANTAGES OF PACKAGING FREEZING WITH AMERIO FREEZERS

*Designed For Ammonia, Brine or Freon Refrigerant*

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Contact Plate Freezers Inc.
Union City, N.J.
"It's the Contacts that Count"

*Send For Illustrated Brochure*




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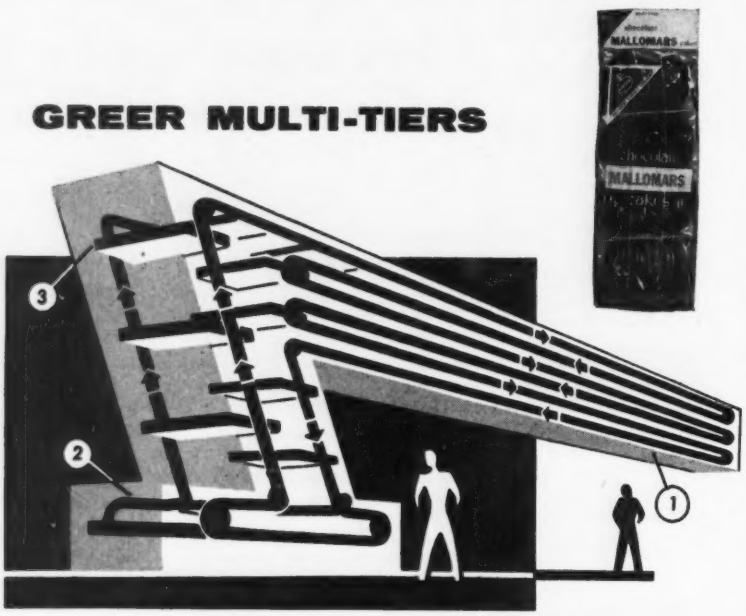
these well-known products are

made better . . . for less, with

GREER MULTI-TIERS




. . . a Multi-Tier will do the same for your products, too! . . . CONVERTS your heating, cooling, drying, and similar operations from batch to continuous processing. PROCESSES your products under exact time, temperature, and atmospheric control. HANDLING reduced to minimum.

1. Saves floor space — makes profits from unused overhead space — ample headroom.

2. Multi-Tier trays convey products through processing cycles of 10 minutes to 10 hours without jar or jolt. Automatic or manual loading and unloading.

3. Trays always perfectly level — permanently attached to positive chain drive. Custom built to fit your product.

*New 8-page bulletin tells how a Multi-Tier will make your products best, for less. Write today.*

J. W. GREER COMPANY

Wilmington, Massachusetts

*Sales Engineering Offices: New York, N.Y., Chicago, Ill., San Francisco, Calif.*

GREER


## Business 'Brass Tacks'

—*Continued from page 82*

7. Labor costs and efficiencies in meat packing.
8. Capital investment in meat packing.
9. The function of profits in meat packing.
10. New developments — a look ahead.

As yet, no textbook is available for this course. However, the educational material includes a large number of publications, charts, and tables issued by the government, by experiment stations, and by the American Meat Institute.

Food associations that do not at present provide educational training courses for member-employees can render a service to their members, and to free enterprise in general, by developing such programs. Those food concerns not represented by an association may be able to make arrangements with a university or college for introducing adequate correspondence courses.

Many are the employees who welcome the opportunity for further education, with the hope of advancing themselves.

Such education does more than improve job performance. It also promotes better understanding of business and makes for more satisfied workers and better citizens.

*End* (*Resume reading on page 83*)

## Individual Servings

—*Continued from page 93*

ton fiber material from which bags are formed. Ribbons of the fiber sheet are fed to the package-forming unit from two rolls on opposite sides of the machine.

Four tucks in the fabric are built into the bag and heat sealed in place as the package is formed. These permit the individual-serving container to open bellows-like to hold a large volume in proportion to outside dimension. A dunking strip is a feature of each bag.

The cut-off operation, employed to sever from each other the formed, filled, and sealed packages, is accomplished by pressure of a sharp knife blade against a spring-loaded steel surface.

Changeover of a machine from coffee bagging to tea bagging requires only the interchange of several readily replaceable units.

In addition to the tea-coffee bagging unit, another machine fills jars

# Sealva

**THE NEW HERMETICALLY SEALED FLAVORS!**

Sealva flavors are protected against the ravages of oxidation and atmospheric change. Sealva processed flavors appear physically as powders, yet in reality they are minute droplets of pure flavor individually hermetically sealed.

Flavor oils show no appreciable change in pure fresh character after a year's aging in Sealva form. The recently developed Sealva flavors have already achieved an amazing reputation in the dry pack food field.

Samples, technical bulletins, and recommendations will be forwarded at your request.

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Alva FLAVORS



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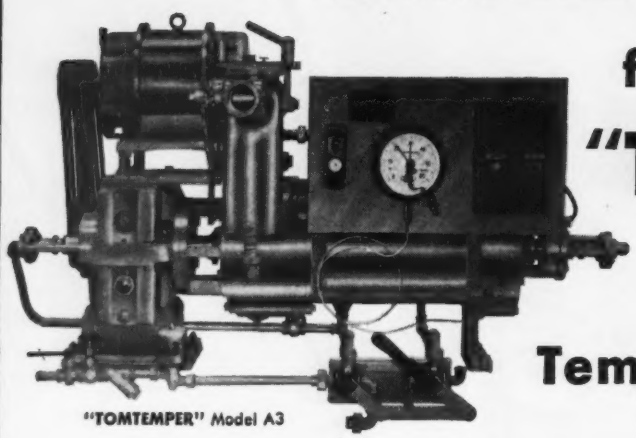
# *Revolutionary...*



"TOMTEMPER" Model A3

## fully automatic "Tomtemper" Chocolate Tempering Machine

## *It Guarantees More Attractive Finish – Finer Fracture – Better Taste*

### JUST LOOK WHAT THE "Tomtemper" OFFERS:

**FULLY AUTOMATIC OPERATION** Easy to operate. Requires only one adjustment.

**MINIMUM PROCESSING TIME** Combines undercooling with intense mechanical mixing to achieve ideal tempering cycle at lowest possible viscosity.

**FAST START UP** Delivers correctly tempered chocolate less than 4 minutes after starting.

**FAST CHANGEOVER** Switches from one type of chocolate to another in 3 to 5 minutes.

**HIGH OUTPUT** Up to 3600 pounds of chocolate per hour; 5000 pounds per hour with accessory cooling.

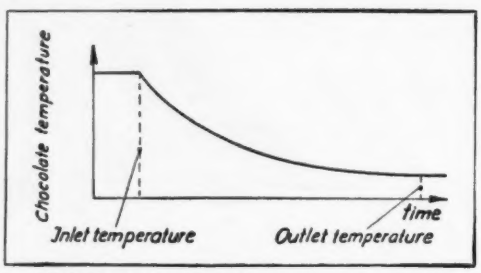
**SMALL SIZE** Measures approximately 47" x 22" x 20".

**ABSOLUTELY HOMOGENEOUS TEMPERING** Exposes every particle of chocolate to same tempering treatment.

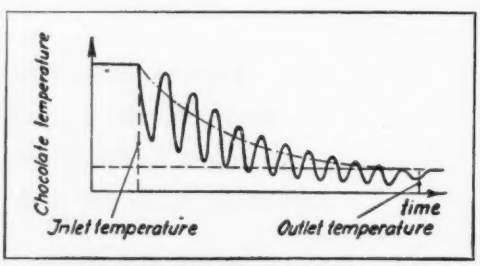
**GUARANTEED ACCURACY** within ± .9°F of desired temp.

And these are but a few of the many outstanding features offered by the *"Tomtemper."*

**"TOMTEMPER"** Thin-Film Tempering Machines are manufactured by TOM'S Laboratory LTD. which also manufactures a line of Fancy Molding Plants and Chocolate Chip Making Machines.




**AVERAGE TEMPERATURE** of chocolate as it progresses through the *"Tomtemper"* is shown above.




**UNDERCOOLING AND MIXING** Graph above shows how *"Tomtemper"* achieves the outlet temperature by undercooling and mixing.

# GEVEKE & COMPANY, INC.

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with a counted number of coffee bags. Jars are then screw-cap closed under vacuum.

Those concerns that prefer to operate their own lines for packaging tea bags or coffee bags may acquire the bagging machine on a lease or royalty basis. Obtainable on the same basis are machines designed for similar packaging of other dry-type foods

*End* (*Resume reading on page 94*)

## Trailers Used as Trucks

—*Continued from page 129*

& Distribution Div., states, the company expects to provide faster and better service for its customers.

But what about the expense of the road tractor standing idle at the break-bulk point? And how do the empty route trailers get back to the Chicago plant?

First off, the two trailers and the road tractor are not Armour vehicles but are owned by the Emery Transportation Co. This is a contract carrier with 25 branch offices in the U.S. and headquarters in Chicago, and with ICC rights to haul any type of food, raw or processed, as well as agricultural commodities.

And so, travel to the break-bulk point is made under the Emery rights, with the trailers contracted, in effect, to Armour, since they carry the Armour name for advertising purposes. Then after the train is broken at the break-bulk point, Armour takes over until the loads have been delivered and the empty trailers returned.

Emery then again assumes the job, hauling the empty trailers back to the Chicago plant to be reloaded and the operation repeated.

Since on a normal day the delivery trucks take approximately 8 hr. to cover their routes, this means that the Emery tractor and its driver wait idle for this time.

However, both outbound and return road runs are interstate (Illinois-Indiana) and so come under the ICC Motor Carrier Bureau regulations. These specify that "No driver should be allowed to operate a motor truck on the open road unless he has had 8 hr. rest previous to the time he started to drive."

Thus, the road-tractor driver gets his necessary rest period before starting back with the empties.

So the road tractor gets a full day's work along with the two Armour delivery tractors. And the two trailers, being used both on the road and the routes, each get the equivalent of two day's work—making for high efficiency in the break-bulk point operation.

*End* (*Resume reading on page 138*)

*Cross-section shows FURNANE Food Plant Floor on concrete slab with membrane. Installation shown is in meat packing plant.*

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NOW you can put an end to floor troubles . . . and recurring floor costs. You can put down a floor to stay. Lasting beauty . . . long service . . . and assured installation techniques are, at last, all combined in a single floor developed especially for the food industry.

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INSIDE SCIENCE

# The Vital Story of VITAMIN C

*by* Science Writer

## *What does vitamin C do for human beings?*

Medical research shows that it is essential in maintaining healthy bony tissue and for the formation of collagen which is the main supportive protein of skin, tendon, bone, cartilage and connective tissue. It is needed for vascular function and tissue respiration and in promoting the healing of wounds. In lactating women it has great importance in providing the infant with a sufficient amount of ascorbic acid to prevent scurvy, a disease to which very young babies are susceptible.

Much evidence is available in medical reports to show that a lack of this vital nutritive element can result in impaired health. And in those cases of frank scurvy which still occur, ascorbic acid is the specific medication.

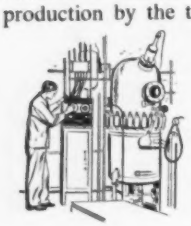
*History.* The history of vitamin C is fascinating. Scurvy, known for centuries, was once the most prevalent disease in Europe. It afflicted the Crusaders, decimated the crews of voyagers and armies, and plagued the colonists of the New World. In the 18th Century the antiscorbutic value of fresh vegetables and citrus fruits was recognized.

*Isolation.* It was not until 1918-25 that almost pure ascorbic acid was concentrated from the lemon by Zilva and its important properties and molecular composition established. In 1927 he concluded that this so-called "reducing factor" and the antiscorbutic principle were closely related. In 1928, Szent-Györgyi, who started investigations in 1921, isolated a strong reducing compound from adrenal glands, oranges, and cabbage and termed it "hexuronic acid."

*Chemistry.* The "reducing factor," "hexuronic acid," and vitamin C were all identified as the same in 1932 by various groups of workers. This was one year after C. G. King, by methods of organic chemistry and experimental physiology, established the chemical identification of vitamin C, thus fulfilling Budd's prediction of 90 years earlier that the antiscorbutic property of certain foods would ultimately be discovered to be a definite substance.

*Synthesis.* In 1933 Reichstein and his colleagues in Switzerland successfully synthesized ascorbic acid. Almost simultaneously in England Haworth and associates accomplished the same. The Reichstein synthesis formed the basis for large scale commercial production by the world-famous firm of Hoffmann-La Roche.

*Production.* Following these discoveries came the establishment of manufacturing operations so that today daily production by the tons is the rule. The figures are really staggering. The amount produced weekly in the U. S. A. averages over 15 tons, equivalent to that contained in over 200 million oranges. It is remarkable that ascorbic acid can be produced synthetically and sold for only about $21. per kilogram. One kilo is sufficient to supply 92 people for one year with the minimum daily requirements set by the U. S. Food and Drug Administration.



Vitamin C made by the Roche process is identical chemically and in biological activity with Nature's own product. Because vitamins can be manufactured at a much lower cost than if they were extracted from natural sources they are widely used in dietary supplements and pharmaceuticals. In fact, "New and Non-official Remedies," a publication of the American Medical Association for use by physicians states: "All pure ascorbic acid used in pharmaceutical products is prepared synthetically."

Ascorbic acid is present in many foods. Nature supplies some with lavish amounts and stints on others. In fact, wide variations* have been found in the vitamin C content in varieties of the same fruit.

*Deficiencies.* Many surveys have shown widespread vitamin C deficiencies in the population. Physicians may call these subclinical, but they are deficiencies nevertheless.

Because of these situations—natural variation and widespread deficiencies—diet experts believe that it is desirable and in the public interest to standardize the vitamin C content of processed fruit and vegetable juices by the addition of enough pure crystalline ascorbic acid to make them consistently dependable sources of this necessary food element. Some of these juices are: tomato, grape, orange, grapefruit, pineapple and apple.

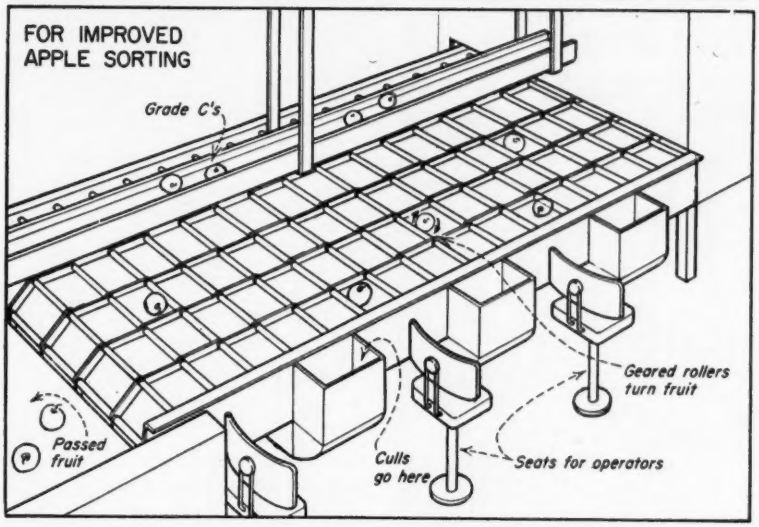
*Requirements.* The U. S. Food & Drug Administration has set 30 milligrams as the adult minimum daily requirement of ascorbic acid. This daily intake is just about sufficient to prevent recognizable signs of vitamin C deficiencies although a subclinical or an unrecognized deficiency may exist. In view of this, the National Research Council has established 75 milligrams as the recommended daily male adult allowance and 70 mg. daily for female adults, which levels are supported by many controlled nutrition studies. However, the N. R. C. recommends 90 mg. daily for boys between 13 and 15, 100 mg. daily for boys between 16 and 20, and 150 mg. daily for lactating women.

This article is published in the interests of pharmaceutical manufacturers and food processors who make their good products better with essential, health-giving vitamin C. Reprints are freely available. Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

*The table shows minimum and maximum levels of ascorbic acid in commercially canned juices. All figures are in milligrams per 100 grams of juice. Data from U. S. Department of Agriculture.

| | *Min.* | *Max.* |
|---|---|---|
| Apple juice | 0.2 | 3.6 |
| Grape juice | 0.0 | 4.7 |
| Grapefruit juice | 10.0 | 49.0 |
| Orange juice | 9.7 | 70.0 |
| Pineapple juice | 5.4 | 18.0 |
| Tomato Juice | 2.5 | 32.0 |

# ADVANCES IN TECHNOLOGY




## Improved Reverse Roll Apple Sorting Table Betters Inspection, Cuts Worker Fatigue

A new sorting table that increases efficiency and reduces cost of grading apples has been developed by Washington State Apple Commission. It could also have wide application to similar work for other fruits and vegetables.

Table consists of a series of closely spaced rollers that turn products so all surfaces are visible to inspectors. Both forward speed and rate of rotation of rollers are variable and can be controlled.

Work surface is divided into 6 sections or lanes running length of table (see illustration). Each sorter is assigned a specific lane and instructed to sort only from that lane. Cull disposal chutes are installed beside each sorter. They are so arranged that culls drop off each chute onto a belt running under the table.

In addition to inducing sorters to face flow of fruit, which provides more thorough inspection, chutes reduce distance culls have to be moved to disposal. Hand nearest cull chute is used to remove culls while the other transfers "C" grade fruit to belt above table.

Specific advantages attributed to the new table are: (1) Elimination of duplication in sorting; (2) development of a feeling of responsibility by sorters; (3) even distribution of work; (4) work of each sorter subject to check; (5) improved sorting techniques; (6) reduction of wrong decisions, and (7) increased output due to reduced fatigue.

Digest from "Speedier Sorting," by W. H. Elliott and J. E. Herrick, *Marketing Activities* (Pub. by USDA Agr. Marketing Service, Wash. 25), 6-10, April, 1954.

### Yeast Cells In Apple Juice

Apple or other fruit juices stored in bulk must have microorganism counts made on them from time to time, and the potential biological activity of the organisms that are present evaluated.

In systems such as the Boehi where juices are stored under high $CO_2$ pressure (up to 120 psi. at 32-50 F.), accurate sampling is not possible since agitation is neither practicable nor desirable.

In apple juice stored under these conditions, yeast cells take on a "resting" state in which proportions of spherical, elliptical, and budded cells remain constant. Ratio of different resting types becomes fixed a few days after juice is stored and does not change as long as physical conditions of storage remain the same. Increases in temperature, or reduction of $CO_2$ pressure, favor fermentation spoilage and quickly disturb the balance of cell types.

By making differential yeast counts at regular intervals, early recognition of incipient fermentation can be obtained on the second or third day; spherical cells decrease, elliptical and budded cells increase. Under conditions studied, 12% budded cells and 46% ellipsoidal cells were accepted as normal; more than this at any time was an indication of incipient yeast spoilage.

Digest from "Rapid Demonstration of Yeast-Cell Activity in Pressure-Stored Refrigerated Fruit Juice," by V. T. Walkley, *Journal of the Science of Food & Agriculture*, 99-103, Feb. 1954.

### Preventing Mold Growth on Fruit Preserves

Appearance of molds on exposed surfaces of preserves is due to insufficient sugar at those spots. And lack of sugar, in turn, is due to its transfer by the processes of osmosis and diffusion.

Action on fruits in strong sugar solution is believed to be primarily osmotic and secondarily diffusional. Water from the interior of the fruit passes into the gel. Syneresis follows, and the gel may become swamped. If the pack is unsterilized or poorly vacuumized a growth of mold appears on the surface of the fruit.

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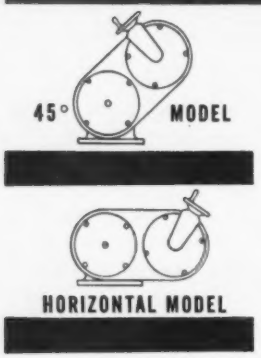
# REEVES

## Fractional HP Motodrive

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This condition can be remedied by taking steps to reduce the effects of osmosis and diffusion. Fruit should be chopped, or if this is not possible, whole fruit should be brought to a boil in syrup of one-half desired concentration. Remaining sugar should be added 24 hr. later. This prevents fruit from shrinking excessively, and yields preserves that rapidly attain a stable sugar concentration that will resist action of molds.

Digest from "The Prevention of Mould Growth on Preserves," by R. E. A. Mapes and A. Kennedy-Ripon, *Food Processing, Packaging, Marketing*, 65-67, Feb. 1954.

## CANNING

### Handling Cannery Wastes

An 11-point program for purification of fruit and vegetable cannery wastes features early elimination and removal of coarse waste by mechanical means, and admixture of factory or domestic sewage to supply nitrogen.

After removal of grit in a constant-velocity channel, some humus sludge is added from the filter effluent and the waste sedimented for about 2 hr. in rectangular tanks before being withdrawn for oxidation on biological filters.

Effluent from sedimentation tanks is diluted with settled effluent from filter to give calculated B.O.D. of 200-250 as the wastes flow to the filters, at a rate of 4 gal./cu. yd./hr. It is very important to return settled humus sludge to primary settling tanks for about 12 hr. out of every 24.

Constant recirculation of filter effluent from settlement tanks following biological filters, and return of humus sludge to primary settlers, combines recirculation and alternate double filtration, the latter during a 12-hr. cycle.

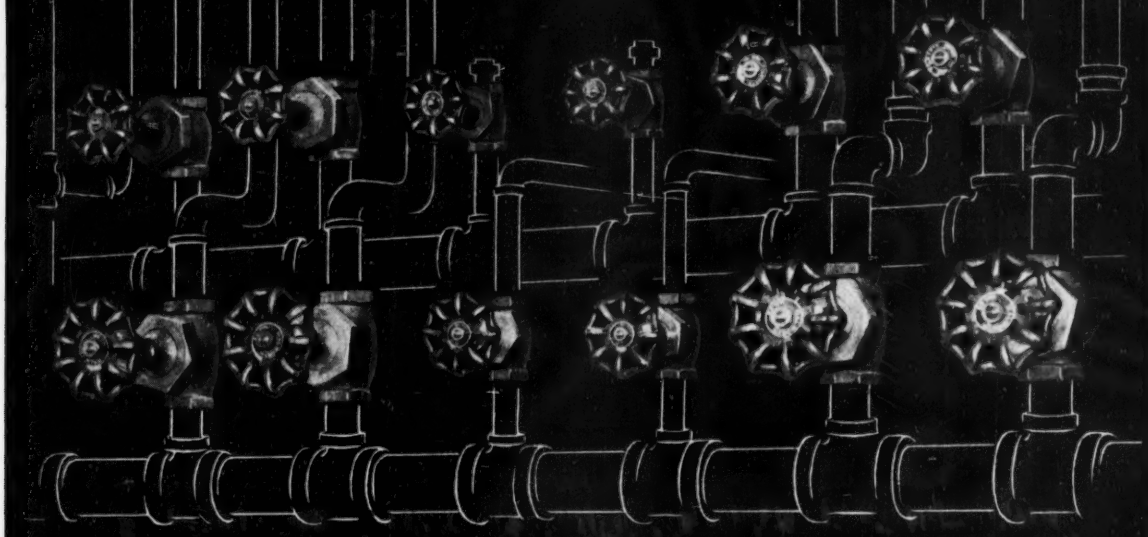
Such a system reduced B.O.D. of waste from 420-1080 to less than 20 throughout the year. There is a limit to biological purification, and it is not practicable to design a filtration plant that will produce an effluent with a B.O.D. of 50 or less, and operate with a minimum of supervision.

Digest from "The Purification of Cannery Waste Waters in Biological Filters," by Denis Dickinson, *Journal of the Science of Food & Agriculture*, 94-99, Feb. 1954.

### Predicting Flat Sours

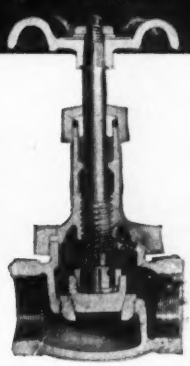
The number of cans of peas that will develop flat-sour spoilage may be predicted by plating 3 ml. of brine from an unprocessed can after

# WALWORTH



## BRONZE VALVES

*Better because* ... **Walworth has standardized its line of bronze valves to provide an unsurpassed system of interchangeability of parts for assembly or replacement. You can maintain a great number of Walworth Bronze Valves with a small inventory of basic parts ... you minimize part replacement problems. For further information, ask us for our Bronze Valve Standardization Chart.**



**Parts are carefully machined and finished to close tolerances, thereby assuring accurate fit and alignment under all conditions. Sectioned valve is Walworth No. 225P Bronze Globe Valve with stainless steel plug-type seat and disc, heat-treated to a minimum of 500 Brinell hardness.**

Choose from complete lines of Walworth Bronze Valves – including gate, globe, angle, check, and lubricated plug types. Walseal® Bronze Valves and Fittings are also available for making silver-brazed joints.

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# Notes on the short way to "nail" corrugated cartons

**Without the "nails"—sealing glue, to you—corrugated cartons couldn't protect your merchandise. And *how* the glue is applied helps determine how well your case will stand up.**

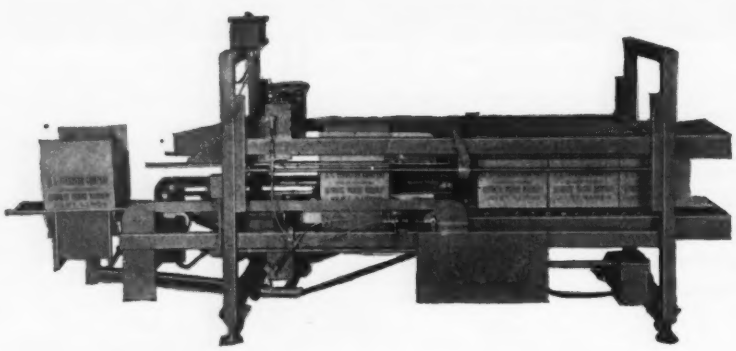
**Saves Glue—Stronger Seals** The Short Case Sealer applies glue in *spots* at ¾" centers, lets it spread and seep into the fibres momentarily, then makes a fast, tight closure. Spot glue application saves at least one third of glue normally used, gives extra strong seals.

**Saves Space—Saves Time** The *all new* Packomatic Short Case Sealer ties in with almost any production line because it occupies less than 30 square feet. It's fast too.

**Few Moving Parts—Low Maintenance** The production and economy of this new Packomatic unit is outstanding. It has fewer moving parts than any other sealer on the market. Moreover, key parts (all easily accessible) are made of brass or stainless steel for ease of cleaning, freedom from rust and corrosion.

**Investigate this new, *better*, less expensive machine for "nailing" your corrugated cartons. Send today for illustrated folder on the Packomatic Short Case Sealer.**

**PACKOMATIC SHORT CASE SEALER—NEW!**

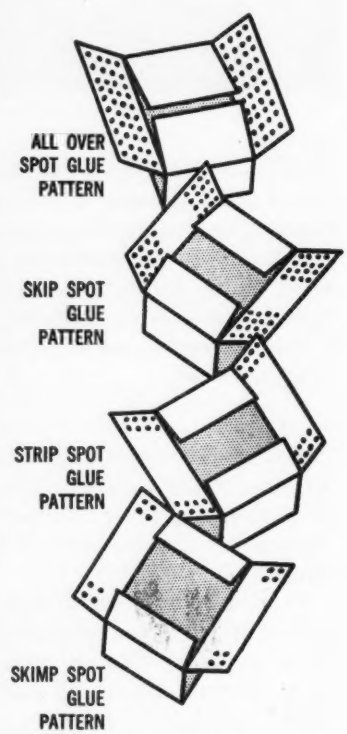


**Rapidly adjusts with this size range**

Length 8" to 24"
Width 6" to 16"
Height 5" to 18"

**Compare Packomatic's sealing speed**

12" long cases—8 per minute
24" long cases—4 per minute
Faster units built on order




Applies glue in "safety" spot patterns

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first autoclaving it at 240 F. for 10 min.

A tryptone-dextrose agar medium, containing bromcresol purple as an indicator for acid development, is used, and plates are counted after 48 hr. incubation at 131 F. All acid producing colonies are counted,

From: (1) Number of flat-sour spores per unprocessed-line can; (2) decimal reduction time (D.R.T.) of flat sour organisms, and (3) lethal effect of processing time expressed in terms of D.R.T., percentage of infected cans after processing can be predicted. Curves are used for estimating processing D.R.T. and final percentage of infected cans.

Prediction is not too exact, but it is more rapid, and as satisfactory as the 5-10 day incubation at 131 F. required by South African law. Method also serves for location of sources of flat-sour infection.

As a control measure, blancher water, washed peas, brine, and unprocessed-line cans should be regularly checked. If a high count is found in the cans, the other two counts will indicate source of organism. If these counts are low, filler bowl and valves should be investigated.

Digest from "A Technique for the Approximate Quantitative Prediction of Flat Souring in Canned Peas," by G. G. Knock, *Journal of the Science of Food & Agriculture*, 113-19, March, 1954.

## CEREAL PRODUCTS

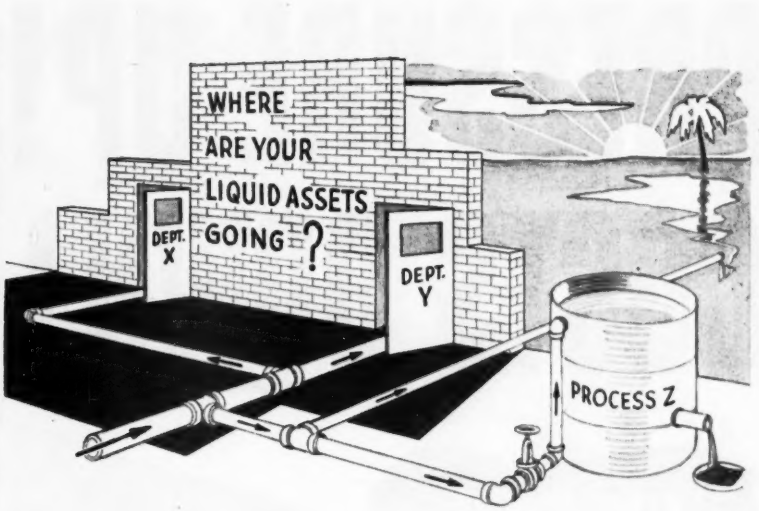
### Thiamine Content of Grains Reduced By Infestation

Damage due to insects feeding on stored grains is obvious, but chemical changes in the grain also occur, and these have not been investigated thoroughly.

Soft wheat was infested with 100 adult weevils (*Calandrae oryzae* L.), khapra beetles (*Trogoderma granaria* E.), or almond moths (*Ephestia cantella* W.) to 70 lb. of grain, and observations were made at monthly intervals. After 6 months weevils had caused the greatest loss in weight (35.12%), had the greatest increase in population (up to 1006.4 per 500g. of grain), and damaged more of the kernels (89.30%), than either of the other insects.

The moths, which feed on the germ, did most damage to viability, reducing it from 89.3 to 17.2%, although weevils were almost as bad (19.40%).

Total nitrogen percentage was practically unchanged. Reducing sugars increased, relatively more in the insect-infested grain. Acidity of


# WATER *costs* MONEY

## Here's a Simple Way to *Reduce* the Cost

The costs of pumping, purifying, softening and distributing water are something to reckon with. Whether you buy from your local utility or pump your own, your plant water supply probably costs more than it should. Hoses left running, cooling water running down the drain instead of recirculating, neglected leaks, etc., quickly add up to large losses. What's worse, they deplete scarce water resources. Even the cost of sewage disposal depends upon *water* used.

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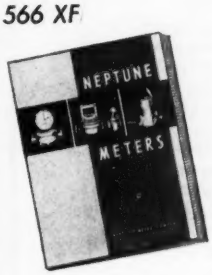


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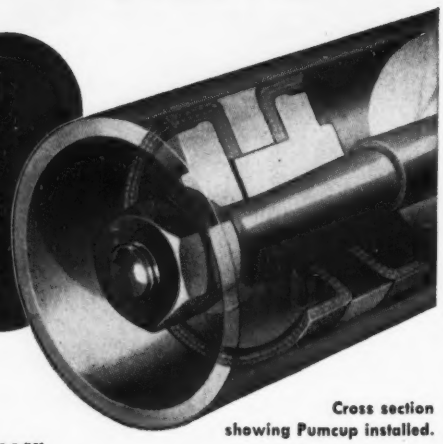

Cross section showing Pumcup installed.

NORMAL wear of ordinary packing reduces efficiency to a tremendous degree.

In contrast, Darcova Pumcups actually retain their efficiency . . . and they outlast most other packings at least 3 to 1!

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**Cost-minded engineers in many industries have standardized on Pumcups to solve their packing problems. The list of successful applications includes the following installations:**

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**PUMCUPS**


the fats increased in all samples, again more in the infested cereals, though oxidative rancidity did not occur at any stage. Thiamine content was reduced by about 50% by all the types of infestation, a serious matter in a country where cereals constitute the main diet of the people.

Digest from "Effect of Insect Infestation on Stored Grain. I. Studies on Soft Wheat," by S. V. Pingale, M. Narayana Rao, and M. Swaminathan, *Journal of the Science of Food & Agriculture*, 51-54, Jan. 1954.

### Glycerides In Flour

While flour and flour oils contain monoglycerides, the amounts are not as large as have been reported by the periodic acid method of estimation (6.8-9.6%). They contain substances which interfere with monoglyceride determinations by this method.

Fractionation indicates that flour oils contain not over 0.25% monoglycerides, and flour about 25 ppm. Consumption of bread and cereals has, therefore, always been accompanied by ingestion of monoglycerides, and since liqids are converted about 50% to monoglycerides in the intestinal tract there is little ground for assuming that monoglycerides are an abnormal foreign substance in food products.

Digest from "The Role of Glycerides in Baking Part II: The Influence of Flour Oils on the Behaviour of Glycerinated Fats in Baking, and the Effect of Natural Monoglycerides Present in Flour Oils and Baking Fats on the Pharmacological Desirability of Using Glycerinated Fats in Baked Products," by J. B. M. Coppock, M. A. Cookson, D. H. Laney, and (in part) D. W. E. Axford, *Journal of the Science of Food & Agriculture*, 19-26, Jan. 1954.

## DAIRY

### Solubility of Milk Powder Improved With Sugars

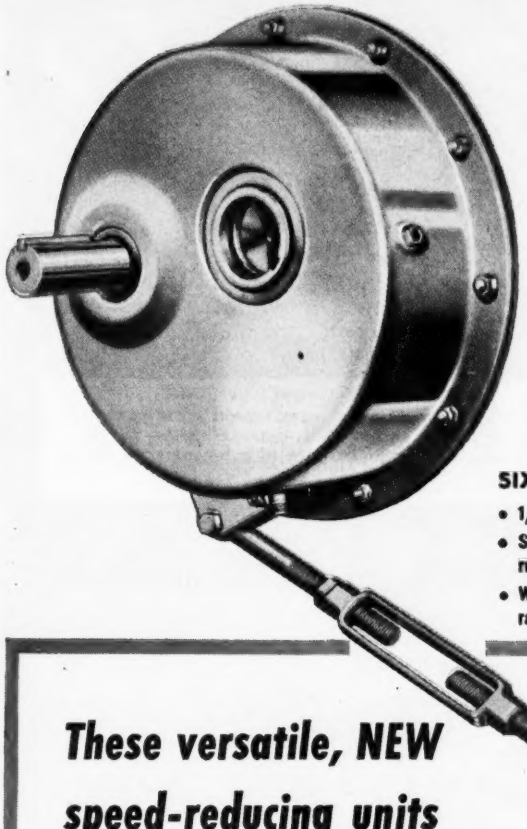
Dispersal of skim milk powder in water is an important property that can be affected by the method employed.

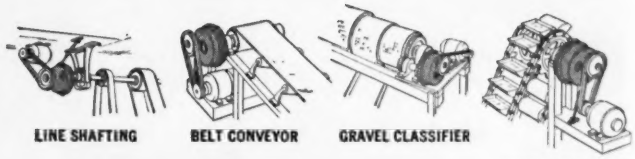
Increasing temperature of reconstitution improves disperability or wetting up to 122 F.; beyond this the powder is wet less readily by water and at 176 F. it is as difficult to disperse as at 50 F.

Sucrose, dextrose, sorbitol, and mannitol increase wettability and improve dispersion when added to the milk powder; 25% of sugars improved wettability by about 50%. When added to the milk before drying there was little or no improvement.

Polyoxyethylene sorbitan monolaurate (Tween 20 and 21) improved wettability when added to the milk concentrate at the rate of 1% of milk

# Falk ALL-STEEL Shaft Mounted Drives



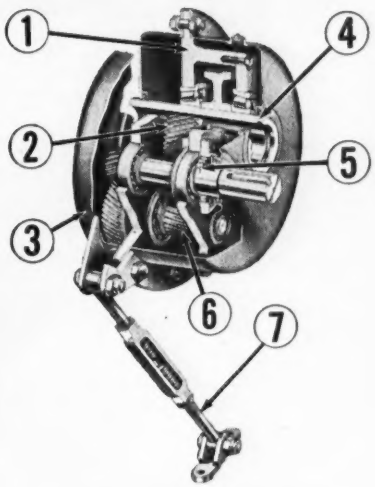



## APPLICATIONS UNLIMITED

The range of applications to which the all-steel Falk Shaft Mounted Drive is ideally suited is so wide that complete listing is impracticable. The sketches above are included only to indicate a few typical installations where considerable speed reduction in limited space is an important advantage.

**SIX SIZES**

- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm




## *These versatile, NEW speed-reducing units*

## save space, power, material and time

Here is the economical solution to the countless application problems requiring efficient speed reduction in limited space! The new Falk all-steel Shaft Mounted Drive—a modification of the universally-accepted Falk Motoreducer design—embodies many exclusive structural and functional features which add up to better service, longer life and substantial savings.

This rugged, compact drive mounts directly on the driven shaft—a distinct saving in floor space. Its precision Falk helical gearing gives highest mechanical efficiency, with a resultant power saving. No adjustable motor bases or slide rails are required. Installation is simple and rapid—output speeds can be quickly changed; thus time is saved...Write to Department 247 for engineering bulletin, including selection and dimension details.

**FALK "In-Built" Factors... that give maximum efficiency, convenience and dependability**

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

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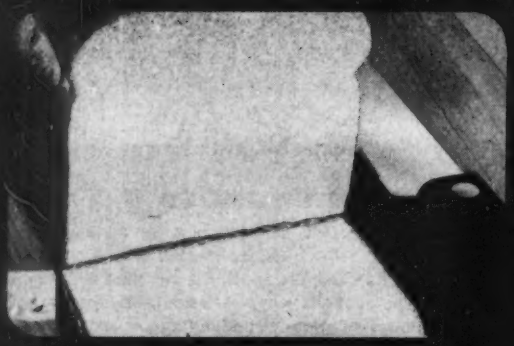
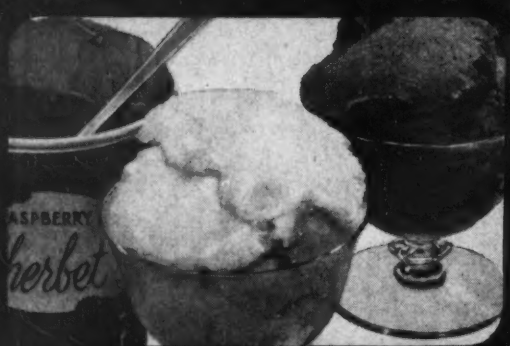


Cerelose saves the baker time and money . . . Compressibility tests show Cerelose-baked bread stays softer longer and is unsurpassed in scoring for texture, volume, grain, thinness of crust and color.

In candy, Cerelose exerts good grain control, produces mixes that deposit better in the mogul, and contributes to a longer shelf life.



Cerelose is indispensable in the manufacture of ice cream, sherbets and ices because it controls crystal formation, yielding smooth, uniform textures which promote true flavors and a longer shelf life.

Cerelose is a pure, clean natural sugar that brings out the true color and flavor of processed foods without developing excessive sweetness.

## Experience specifies CERELOSE

To achieve greater efficiency *and* superior quality is the problem these days. Cerelose® brand dextrose, manufactured under rigid controls, helps the food industry develop top-quality products because of its uniformity, purity and adaptability. You can be certain of its performance at all times. Cerelose is always available in quantities to suit your needs.

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solids before drying. Sorbitan monolaurates (Span 20) did not affect wettability appreciably.

The temperature effect on reconstitution is probably a reflection of increased lactose solubility up to the point where protein denaturation occurs. Effect of sugars is to increase the area of contact between particles and dispersing medium, while the Spans and Tweens are surface active agents that make wetting of particles easier.

Digest from "Studies on Improving the Ease of Reconstitution of Skim Milk Powder," by D. L. Gibson and J. W. Raithby, *Canadian Journal of Technology*, 60-67, March, 1954.

### Increasing Whey's Value

Cheese whey fermented by *Torula cremoris* and dried, possesses more protein, fat, thiamine, riboflavin, calcium and phosphorus than skim milk powder.

As a protein supplement it is equivalent to dried skim milk when fed to mice on a wheat-oats ration, even though its methionine content is less. Its thiamine content is only about a tenth of that of brewers' dried yeast, but this is not a serious defect, since cereals are more likely to be short of riboflavin than thiamine, and yeast-whey is equivalent to yeast in this vitamin.

Digest from "Increasing the Food Value of Whey by Yeast Fermentation. IV. Feeding Trials with Mice," by J. M. Bell, V. E. Graham, D. L. Gibson, and W. C. Lawton, *Canadian Journal of Technology*, 55-59, March, 1954.

## FATS & OILS

### Optimum Blowing-Steam Rate In Oil Deodorization

In a mathematical study of oil deodorization the author proposed that, technologically, there is an optimum blowing-steam rate characteristic of each individual system, and that rates above this optimum lessen the degree of deodorization.

Commercial practice at present is estimated to vary from 3% for some continuous systems to over 100% in older batch processes. Percentages relate to the weight of stock deodorized. In most cases the rates are based on rule-of-thumb practice.

In the present instance, experimental data were collected over a period of 5 months from a commercial batch deodorizer operating on a 7 hr. cycle handling 15,500 lb. hydrogenated soybean oil per batch at 400-430 F. Blowing-steam rate varied from 0-550 lb. per hr., with sustained operation at various settings between 200-550 lb. These operating data were analyzed according to Bailey's equation for batch

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# Better DUST CONTROL ENGINEERING IS IMPORTANT!

DAY *engineered* dust control includes plant survey, system layout, strategic location of equipment and efficient installation. These factors and many more are included in DAY'S *engineered* dust control to assure you the utmost in effectiveness and over-all economy.

DAY *engineered* dust control is backed by a program of constant research for greater equipment and system efficiency. For example, DAY engineers achieved an important advancement in dust filter efficiency with the development of DAY'S patented SELF-ADJUSTING BLOW RINGS for the DAY "AC" (Hersey Type) Dust Filter. These blow rings compensate for any variation in filter tubes due to changes in temperature, pressure, moisture conditions, etc. *They assure perfect cleaning air contact.*

**5 Important DAY Advantages**

1. **DAY'S continuous Reverse Jet Cleaning permits the use of more efficient filter media which gives filtering efficiencies up to 99.99+%.**
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3. **Continuous, automatic operation without the necessity of shutting down any section for cleaning.**
4. **Air-to-cloth ratios to as high as 20 to 1.**
5. **Self-Adjusting Blow Rings assure perfect reverse air to cloth contact.**

**Write For New Bulletin**

*If you have a dust control problem, whether it involves a complete system or a single unit, your inquiry is invited. WRITE FOR BULLETIN 528-R.*

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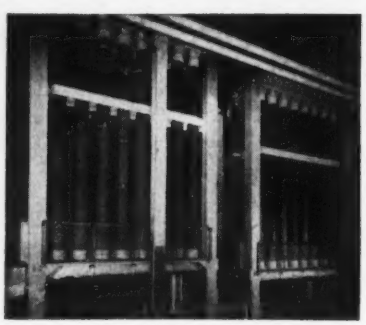
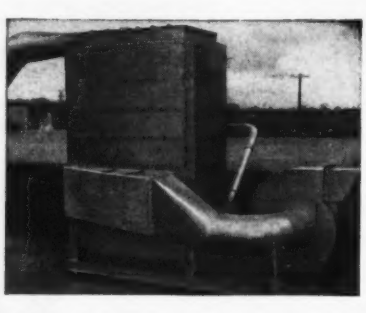
DAY SINCE 1881 DUST CONTROL
A SINGLE UNIT OR A COMPLETE SYSTEM

**Photo shows two of eight DAY "AC" Dust Filters used by Chas. Pfizer & Co., Inc. The filters shown are located at the Groton, Conn. plant. DAY'S Reverse Jet Cleaning permits the use of a better grade of pressed wool felt which captures even submicron dust particles.**



**Two of the eleven DAY "AC" Dust Filters used by Pillsbury Mills, Inc. The filters shown are in the cake mix plant at Hamilton, Ohio. Space and headroom were at a premium in this modern, one story plant and the dust control equipment was placed to consume a minimum amount of space. Leading millers and food processors recommend DAY for dust control engineering.**



**DAY "AC" Dust Filter installation, Lapp Insulator Company, LeRoy, New York. The company reports—"most of our dust is very fine and varies in size from 1 micron to 25 microns. The DAY Dust Filter solved our dust problem". DAY "AC" Filters consistently provide filtering efficiencies up to 99.99+%.**


deodorization, and the indicated optimum was found to be 350 lb. per hr.

Principles involved are applicable to continuous or batch systems of any size. It is recognized that this technically optimum blowing-steam rate may not coincide with the most economical conditions of operation, depending on the characteristics of the system, but it is concluded that operation at rates appreciably above the optimum are not justified.

Digest from "Optimum Blowing-Steam Rate in Deodorization and Steam Distillation," by L. D. Chirgwin, Jr., *Journal of the American Oil Chemists' Society*, Vol. 30, 583-86, Dec. 1953.

## SANITATION

### Iodophors as Germicides

Some new products known as "iodophors" in which iodine is combined with non-ionic wetting agents and phosphoric acid have good germicidal activity and stability.

When compared with hypochlorite solutions and some commonly used quaternary ammonium compounds, two of the iodophors, "Iosan" and "Iobac" were found to be effective against *Micrococcus oyogenes* var. *aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa* at much lower concentrations (50 ppm. or less) than other germicides. Quaternaries were found relatively ineffective below 100 ppm.

Because of their acidity, iodophors inhibit milk stone formation on dairy utensils and equipment and are active in hard water. Milk stone was actually removed by repeated brief immersions in 25 ppm. Iosan solutions.

Corrosion of stainless steel or tinned iron is negligible, and 25 ppm. solutions of Iosan or 7.5 ppm. of Iobac have given very satisfactory results for farm use. Since the solutions have a pale yellow tinge even at 5 ppm., their strength can be readily estimated and there is no reason to use an exhausted solution.

Digest from "Iodophors as Sanitizing Agents" by C. K. Johns, *Canadian Journal of Technology*, 71-77, May, 1954.

## MEATS

### Preventing Thaw Rigor

Freezing of meats before *rigor mortis* is completed can lead to abnormal behavior on thawing.

Onset of *rigor mortis* in beef resembles closely its onset in rabbit muscle and is paralleled by dephosphorylation of adenosine triphosphate (ATP) and pH reduction from about

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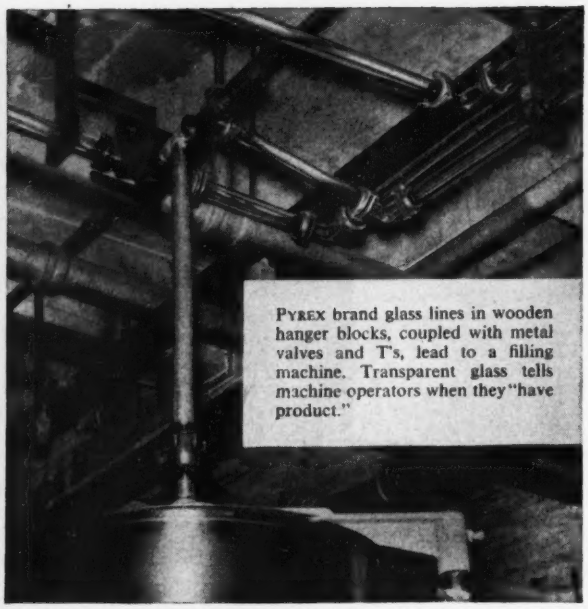
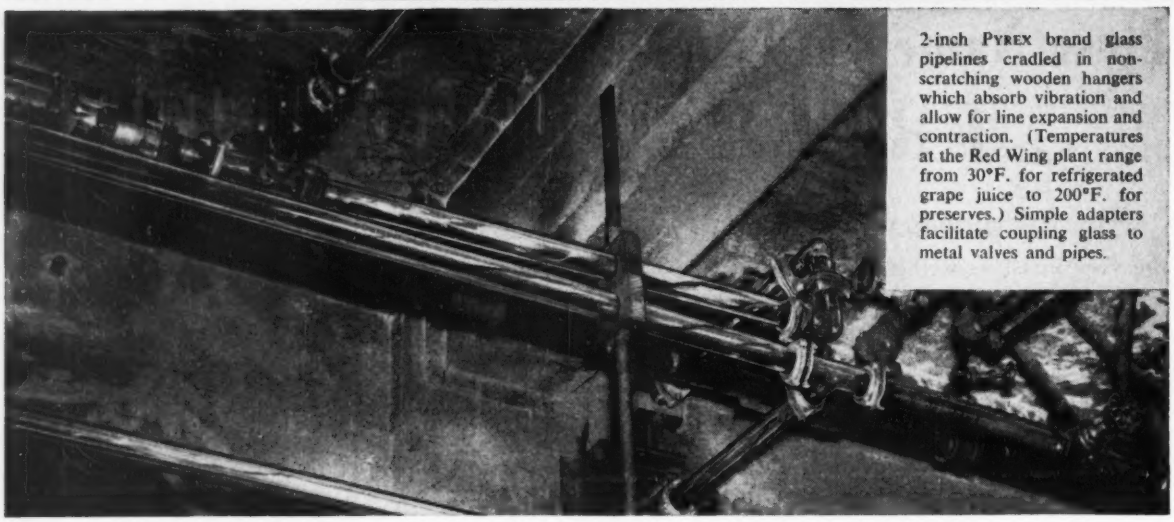
A 4-inch PYREX brand line, with reducer T, leading from a tank in the cooking room. You get the corrosion-resistance and visibility of glass, plus a sturdy, permanent, simple piping installation.



PYREX brand glass lines in wooden hanger blocks, coupled with metal valves and T's, lead to a filling machine. Transparent glass tells machine operators when they "have product."



2-inch PYREX brand glass pipelines cradled in non-scratching wooden hangers which absorb vibration and allow for line expansion and contraction. (Temperatures at the Red Wing plant range from 30°F. for refrigerated grape juice to 200°F. for preserves.) Simple adapters facilitate coupling glass to metal valves and pipes.

# How you can **see** when your product lines are clean

"We like PYREX pipe because we can *see* it's clean," explained the Superintendent of the Red Wing Company canning plant in Fredonia, N. Y.

"We don't have to ask 'Joe' if he has cleaned the lines—we can see for ourselves. And visibility also tells our filling machine operators when they 'have product.' "

The Superintendent also pointed out that handling fruit juices, catsups, sauces, preserves, and jellies once posed annoying and costly pipeline corrosion problems which PYREX brand pipe has solved.

Altogether, the Red Wing Company is an enthusiastic user of PYREX brand "Double-Tough" glass pipe. Their plant men find it simple to handle. It's easy to flush clean. Maintenance is no problem. And Red Wing has experienced no breakage, either during installation or operation.

Have you investigated the operating and maintenance advantages PYREX brand "Double-Tough" glass pipe offers? Corning Bulletin EA-1 will tell you more about them. We'd like to send you a copy.

**CORNING GLASS WORKS, CORNING, N. Y.**

*Corning means research in Glass*

**Food Engineering Reports**
**LATEST TECHNICAL NEWS**
**In Keeping Up With Field. . . page 193**

7.0 to about 5.30. Rate of pH change with temperature is greater in beef than in rabbit muscle; a drop of 18 deg. F. has as great an effect on beef as 36 deg. on rabbit.

Onset of rigor in beef may be followed approximately by pH determinations. With pH of 7.10 two hours *post mortem* and a final pH of 5.30 when rigor is completed; the glycolytic changes are complete in about 30 hr. in surface muscle and in 26 hr. in deep muscles.

A 36-hour interval between killing and beginning of freezing should avoid complications associated with "thaw rigor".

Digest from *"Rigor Mortis* in Beef," by B. B. Marsh, *Journal of the Science of Food & Agriculture*, 70-75, Feb. 1954.

—End—

## Action on Accidents

—*Continued from page 68*

dustry has been swept into the union camp, without any obvious relative impact on work stoppages.

During the period 1948 to 1952 man-days lost by food workers in proportion to man-hours worked were more than in many of the years in the 20's and 30's. Even so, the favorable comparison with all-manufacturing still stands.

Probably the relative freedom from work stoppages is the result of conditions inherent in food manufacturing.

Our industry does offer a greater degree of job security than most. Aside from the few remaining strictly-seasonal operations, our industry provides for most of its workers year-around employment without the threat of frequent or unexpected layoffs. And in seasonal operations, employment is accepted as temporary.

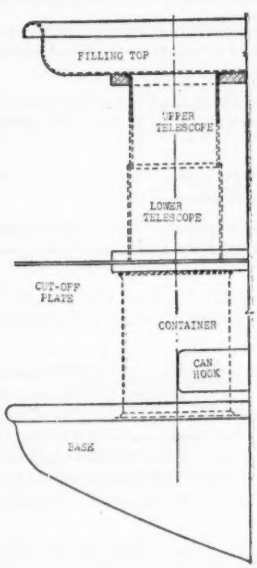
Some of the manufacturing industries that have had greatest work-stoppage losses are required, by their nature, to employ workers with a high degree of skill and intelligence—accompanied by intense personal ambition and driving initiative. In the past, workers of this level—though desirable—have not been mandatory to food plant operations.

Future requirements of our industry will be different. Technical improvements, engineering advances, automation innovations, and the like, will necessitate drawing into food plants, and binding therein, many of


# Now It Measures the Amount of Fill

***An Improvement on the Standard Model No. 650 Hand-Pack Filler Now Available.***

A new filling top equipped with adjustable telescoping pockets on the standard Model No. 650 Hand-Pack Filler permits filling a volumetric measured quantity of product into tin or glass containers.




Two or more fillers in series can fill a measured quantity of more than one product into the same container.

Can be equipped with a force-feed hopper and briner if desired.

Will handle any product that can be filled in a standard Hand-Pack Filler.

Contact your CRCO Representative or write for details and prices.

THE BEST OF Everything

**CHISHOLM-RYDER CO. INC.**
Niagara Falls, New York
FOR THE FOOD PROCESSOR

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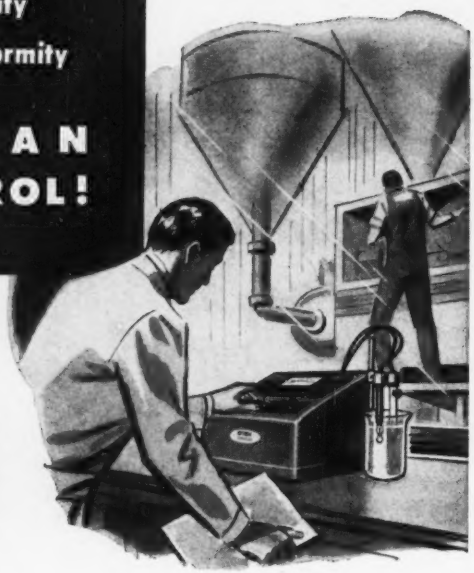
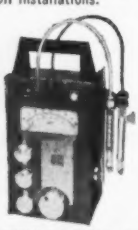
*Improve* Flavor Quality Uniformity with

**BECKMAN pH CONTROL!**



**AUTOMATIC:** The compact new Beckman Model W Industrial pH Meter utilizes a plug-in design to simplify servicing. Provides accuracy within ± 0.02 pH under severe conditions.

**GENERAL-PURPOSE:** Beckman Model H-2 pH Meter operates directly from 115 v AC current—is widely used for manual pH control in small plants and as an auxiliary instrument on completely automatic pH installations.



**COMPLETELY PORTABLE:** Beckman Model N pH Meter operates from self-contained power supply—is unusually compact and completely portable. Can be used anywhere—plant, field or laboratory—without dependence on AC power circuits.

***Write for full details on the above and other Beckman pH equipment.***

***Data File 52-18***

HAVE YOU INVESTIGATED what others—*possibly your own competitors*—are doing to cut costs, improve flavor, quality and uniformity in food processing with the aid of Beckman pH Control? Here are a few of many typical examples of the advantages being gained with Beckman pH equipment . . .

- **DAIRY PRODUCTS:** Better quality and flavor in the various milk processing and cheese making operations.
- **BAKING:** Better quality and uniformity—fewer rejects—in the baking of crackers, bread and similar products.
- **BREWING, DISTILLING:** Improved fermentation and flavor control in brewing, wine making and distilling processes.
- **JAMS, JELLIES:** More accurate control of flavor, uniformity and jel consistency.
- **CANNING:** Better sterilization, flavor and quality in virtually all types of canning and preserving operations.

. . . and vital savings in time and processing costs in a wide range of other food processing operations!

LET US GIVE YOU THE FACTS! No matter what the nature of *your* food processing operation, check to determine the type of savings to be made by Beckman-controlling the pH of your processes. Our trained engineers will gladly study *your particular* operations and make recommendations—without obligation, of course.

For detailed information see your nearest authorized Beckman dealer.

**Beckman** *division*

BECKMAN INSTRUMENTS, INC.
FULLERTON 1, CALIFORNIA

industry's most highly skilled workers.

It may, then, not be too apparent why food's strike record has been relatively good. The fact remains, however, that a strike in your plant can ruin your profit picture for the year. So it pays to give pointed attention to your labor relations.

Despite the strike record, many food companies have much room for improvement in this respect. Most of the other industries have been forced to advanced—yes, enlightened—management-labor relations and personnel procedures. We're next. And it is time to get going.

But let's not overlook the fact that, though it is essential to avoid strikes and strive for industrial peace, accident reduction offers a 5-to-1 greater opportunity for dollar-and-cents savings.

*End* (*Resume reading on page 69*)

## Psychometrics

—*Continued from page 65*

cal measure of the magnitude of the differences between the various packages and the original (control) sample.

In every case, data are analyzed statistically for differences due to chance variation. This is accomplished by means of a critical ratio (C.R.) technique. In order for a difference to be statistically significant, the C.R. must be equal to 1.96, or greater. The larger the value, the greater the difference.

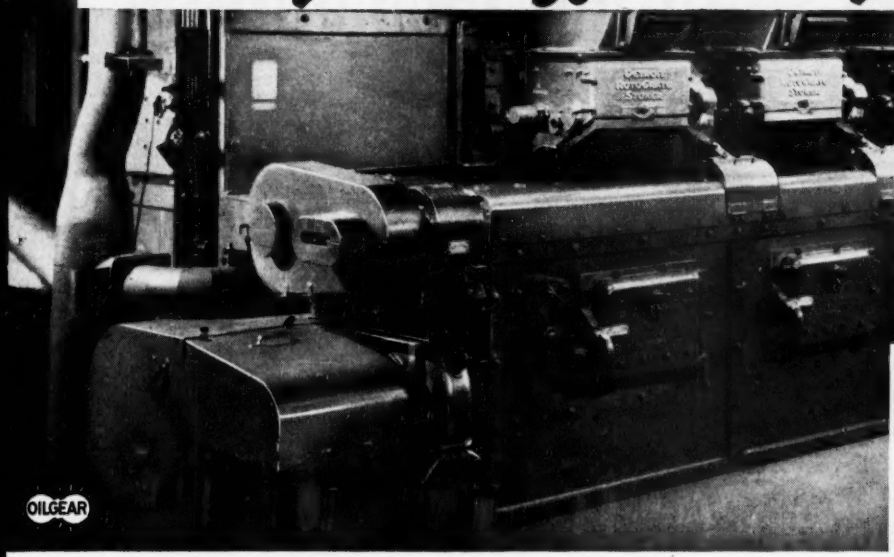
Every sample was tested by the difference method against the control popcorn. Once a significant difference appeared, absolute ratings were immediately obtained, and these were repeated for the remainder of the program. This approach facilitated interpretation of difference data in terms of consumer acceptance ratings (see "Ultraviolet Exposure" in accompanying panel).

To further illustrate, note Sample III in above. Contents of this package became significantly different from control on first test day, or 2nd day of exposure. An absolute rating was obtained, indicating that consumer acceptance had been significantly lowered. It was then in the "Neither Like nor Dislike" category as opposed to the "Like Moderately" rating, achieved on the popcorn as received.

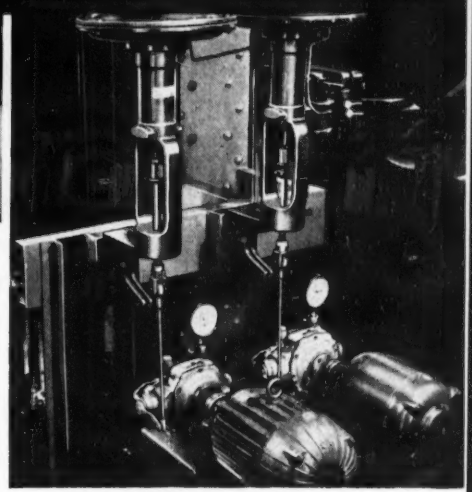
Now note Sample V. It became different on the 9th day, and it achieved an absolute rating of 4.1. This development is similar to the rating achieved by Sample I. But in this case it occurred after nine days of exposure.

From this data, it is possible to rank bags in order of their relative

# "ONE OF THE *Highest Efficiency Units*" IN THE UNITED STATES



View in J. I. Case Co. tractor works at Racine, Wis. Boiler front and Detroit Roto-Grate Stoker on 100,000 lb. per hr. boiler unit.



Two Oilgear Variable Delivery Pumps with simple diaphragm actuated hydraulic servomotor lever controls supply fluid power for the fuel feed and grate drives. An Oilgear drive was experimentally installed on the fuel feed on the first stoker in 1948. On the basis of its performance, Oilgear drives were used for *both* fuel feed and traveling grate on a second stoker unit installed in 1949. Also, Oilgear will replace the mechanical grate drive on the first stoker installed in 1943. Like a shadow, flexible, controllable Oilgear *Fluid* Power causes fuel feed rate and grate speed to accompany steam demand up and down. Recording charts show steam *demand* varies "all over the place," but steam pressure and fuel air ratio stay steady.

## And Oilgear's Range and Control help capture savings hidden in J. I. Case 100,000 lb. Boiler Unit

The 100,000 lb. per hour boiler unit in the J. I. Case Co. tractor works at Racine, Wisconsin, has demonstrated that it is one of the highest efficiency units in the United States. To obtain such high efficiency, careful tests of variable speed drives for fuel feed and grate travel were made during two years. Finally, Case engineers selected Oilgear Fluid Power Drives, for, as Mr. Cole H. Morrow, Chief Plant Engineer says, the Oilgear units proved far superior to electric drives and mechanical transmissions under actual operating conditions.

**SMOOTH, POSITIVE SPEED VARIATION** "In order to obtain high efficiency in any boiler unit," says Mr. Morrow, "*a very precise variable speed fuel feed drive* is required to meet widely varying demand. The Oilgear Drive gives smooth, positive variable speed operation from zero to 100% of capacity with a straight line fuel feed characteristic. This allows us to calibrate the control system for operation within amazingly close limits of fuel-air ratio variation.

**EASE OF CONTROL** "Also, on this type of stoker the grate speed must be infinitely variable from minimum to maximum yet maintained in direct proportion to the rate of fuel feed. Every change in fuel feed requires an immediate and directly proportionate change in grate speed. (Such synchronization) is easily obtained with the Oilgear drive units because of their ease of control, and the simplicity and low force requirements of the control mechanism."

**UNLIMITED SPEED RANGE** Also, fuel feed and grate drives must have a range of speed at least equal to the demand range. Most drives have a range not exceeding 4 to one. Yet at Racine, during the summer, demand drops far below the 25,000 lb. threshold imposed by such a ratio. The Oilgear Drives however have no "ratio" limits, would function down to zero load if necessary. In fact, they give precise load control down to a load of 15,000 pounds per hour normally obtained each day during the summer, and down to as low as 5,000 pph over the weekends still under full automatic control.

**OUTSTANDING RELIABILITY** "One of the outstanding features we discovered . . . was the *reliability of the Oilgear units.* The experimental installation operated almost continuously for a year and a half without any difficulty. This record was far better than we were able to obtain with any other type of drive or transmission."

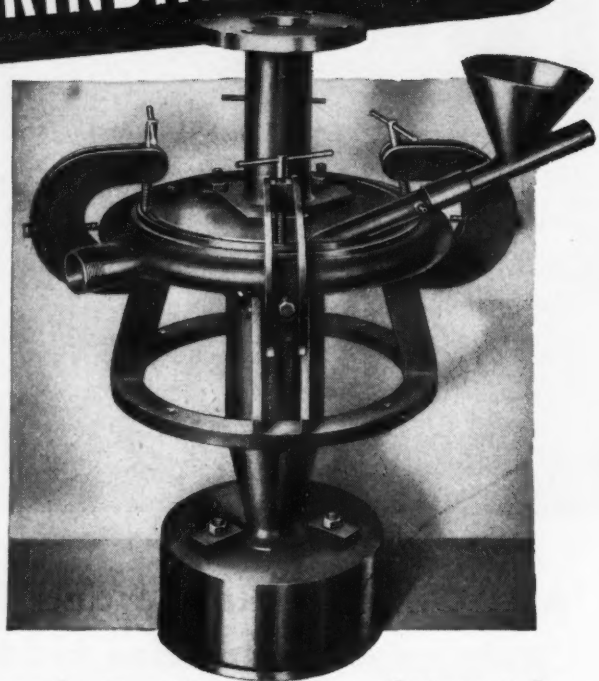
These four features, variability, ease of synchronization and control, actual range from zero fpm, rpm or torque up to maximum, and reliability proven over and over again, are indications of the many advantages Oilgear drives and transmissions offer in machine design and use. Investigate Oilgear equipment as a *better* solution for your problems. THE OILGEAR COMPANY, 1580 West Pierce Street, Milwaukee 4, Wisconsin.

**Oilgear**

**PIONEERS IN FLUID POWER**
**PUMPS, TRANSMISSIONS, CYLINDERS AND VALVES**

# Sturtevant

# MICRONIZER* GRINDING MACHINE



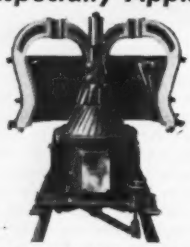
### *Reduces Solids to Micron Sizes*

The new Sturtevant *Micronizer* grinding machine is a fluid jet grinder especially designed to reduce solid materials to particle sizes in the micron ranges.

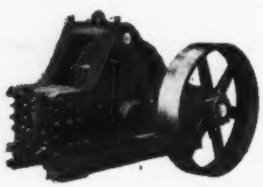
Sturtevant *Micronizers* are used for simultaneous dry grinding and classification of solids. The variety of materials that can be processed is large and includes both metallic and non-metallic minerals and ores, metals, pigments, insecticides, fungicides, pharmaceuticals, plastics, dyes and numerous other organic and inorganic products. Available in capacities from ½ to 3000 pounds per hour.

## Other Sturtevant Pulverizing Equipment for Rapid Reduction of Materials...

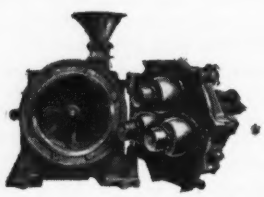
***Especially Applicable for Initial Grinding of Products for the Micronizer Mill***



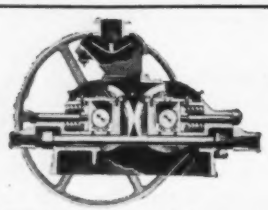
*ROTARY FINE CRUSHERS* for intermediate and fine reduction (down to ¼"). Open door accessibility. Soft or moderately hard materials. Efficient granulators. Excellent preliminary Crushers preceding Pulverizers.



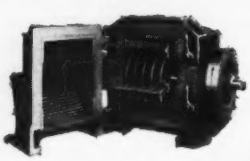
*JAW CRUSHERS* for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.



*RING-ROLL MILLS* for medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operated in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



*CRUSHING ROLLS* for granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8 x 5 to 38 x 20. The standard for abrasives.



*SWING-SLEDGE MILLS* for coarse and medium reduction (down to 20 mesh). Open door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.

*AIR SEPARATOR* for separation of fines to 325 mesh and finer. Increases output from 25% to 300%... lowers power costs by 50%. Capacities ¼ to 50 tons per hour output.

*Registered trademark of the Sturtevant Mill Company

## STURTEVANT MILL COMPANY

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*DESIGNERS & MANUFACTURERS OF* DENS AND EXCAVATORS • MIXERS • SCREENS • PULVERIZERS • ELEVATORS • AND COMPLETE FERTILIZER UNITS

effectiveness in withstanding ultraviolet radiation (downward from good to bad) as follows:

1. . . . . VI
2. . . . . IV
3. . . . . II
4. . . . . V
5. . . . . I
6. . . . . III

**"Temperature and humidity exposure"** data in panel show less differentiation between bags than was developed in the ultraviolet exposures. This may be attributed to the proximal moisture vapor transmission (M.V.T.) ratings obtained on test samples.

There were, however, some striking differences: Samples III and V never became significantly different from control product, indicating suitability of these bags under high temperature and high humidity conditions. Samples I and VI became different on the 7th day, Sample IV on the 9th day, and Sample II on the 11th day.

From the above difference and absolute flavor test data, it is possible to rank the bags in order of their relative effectiveness in withstanding high temperatures and humidities as follows:

1. . . . . V
2. . . . . III
3. . . . . II
4. . . . . IV
5. . . . . I
6. . . . . VI

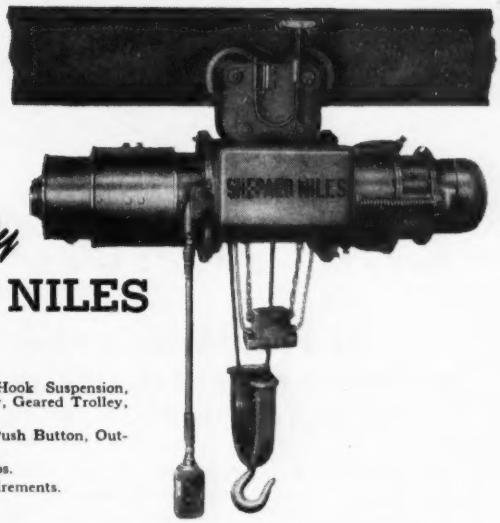
Based on psychometric flavor tests it is possible to conclude that the sample bags differ in relative effectiveness in withstanding ultraviolet radiation, high temperatures, and high humidities.

These findings are substantiated to a large extent by a parallel physical test program. This corroboration particularly is evident in the case of the product exposed to ultraviolet radiation (see graph, top of panel). If we range physical data in the same manner as psychometric results, popcorn in Bag III would correspond to the most sharply accelerating curve, thus ranking sixth. VI was most resistant and would rank first. Similarly, the remaining packages could be arranged in an order differing by only one reversal from psychometric ranking.

For packages exposed to high temperature and high humidity, this degree of similarity between psychometric and physical data is somewhat less pronounced. This trend can be attributed, as was previously indicated, to the proximal M.V.T. rates obtained on all of the test bags.

When the absolute rating scale was employed, consumers were questioned regarding the reasons for their judg-


# Choose the hoist *that* fits the job!

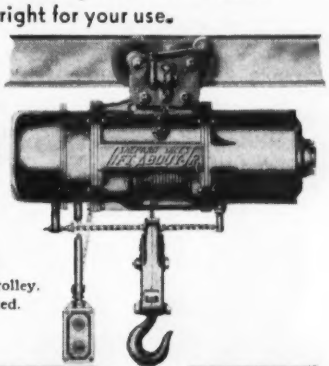



*Heavy Duty*
**SHEPARD NILES Hoist**

Types: Lug Suspension, Hook Suspension, Base Type, Push Trolley, Geared Trolley, Motor-driven Trolley.
Controls: Pendant Rope, Push Button, Outrig, Remote.
Capacities: 500 to 40,000 lbs.
Speeds: To meet your requirements.

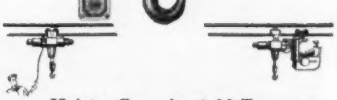
**IT PAYS** to choose the right hoist for your lifting job . . . the wrong choice can be costly! Let a Shepard Niles representative guide you in selecting the hoist that best suits your needs. He's a specialist in through-the-air handling . . . knows which model, capacity and controls will be right for your use.

*Light Service*
**SHEPARD NILES**
*LIFT ABOUT-JR.*




Types: Lug Suspension, Hook Suspension, Push Trolley.
Controls: Single Speed, Push Button, Rope Operated.
Capacities: 250, 500, 1000, 2000 lbs.

CRANES: Capacity 1-450 Tons



Hoists: Capacity 1-20 Tons

**SHEPARD NILES**
CRANE AND HOIST CORPORATION

SHEPARD NILES Crane and Hoist Corp.
1248 Schuyler Ave., Montour Falls, N.Y.

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THE Automatic CAMPBELL WRAPPER
PACKAGES PRODUCTS LIKE THESE WITH
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Yes, 100 to 300 units per minute! Plus all the important operating features you want in modern package wrapping — Automatic, continuous feed and delivery with all rotary motion — "Float" wrapping of regular or irregular shaped products without crush or damage, whether hard, soft, firm or brittle — Savings galore with one person operation, who, in many cases tends several machines at the same time — 25 to 50% less material cost because no trays or stiffeners are required, unless desired — Positive heat, glue or crimp sealing with all types of modern wrap materials — And, accurate registration of pre-printed or applied labels. Get full details today . . . there's a model to fit your every need.
MEDICAL DROPPERS
BAKERY PRODUCTS
CITRUS FRUIT AND VEGETABLES
ICE CREAM NOVELTIES
CAMERA FILM
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We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments. Civilian orders are filled on a reasonable time basis only.
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WRAPPER
Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Creepers and Tissue Converting Units
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ments. Samples exposed to ultraviolet radiation, once they had become different, were reported as "rancid," "sour," and "stale." However, these comments were not interpreted to be as meaningful as the absolute ratings. For, frequently, a consumer is unable to describe accurately those factors that produce a rating on the scale. Therefore, primary purpose for insertion of the "Why" question is to force a greater degree of attention to the problem at hand.

The popcorn exposed to high temperature and humidity was reported as "soggy," "tough," "stale," and "rancid." Here again, little inter-sample differentiation exists, based on these subjective reports.

In the case discussed above, it was possible to obtain a high degree of correlation between the physical and the psychometric flavor tests. These two approaches complemented one another, yielding a sensitive criterion for measuring rate of product degradation as a function of the relative effectiveness of the packaging materials.

*End (Resume reading on page 66)*

## Chemical Cleaning

*—Continued from page 59*

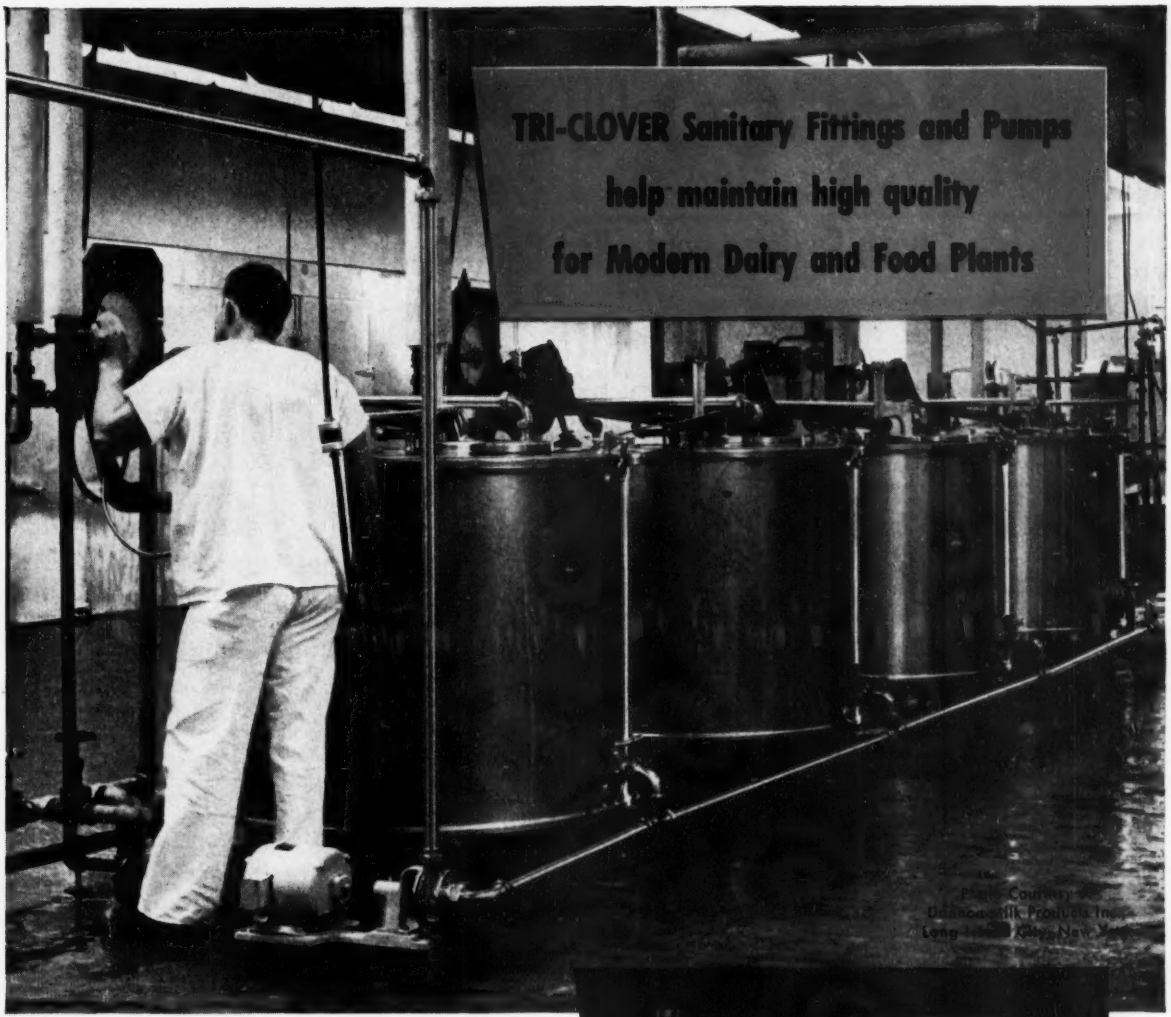
**6. Multiple effect evaporators for salt manufacture:** Objectionable deposits in first effect were almost pure calcium sulfate. Those in 2nd effect, were a mixture of calcium sulfate and calcium carbonate, and in 3rd and 4th effects, deposits were practically pure calcium carbonate.

Units were filled with inhibited acid to a level slightly above the upper tube sheet. Solvent, heated with steam, was pumped into the evaporator effects. Within 4-6 hr. the 3rd and 4th effects were free of scale, 2nd effect was almost clean, but first effect still contained a considerable amount of calcium sulfate scale.

Even though calcium sulfate has but low solubility in acid, after this treatment the 1st and 2nd effects were turbined by 2-men crew in 6 hr. Manual cleaning generally requires a crew of 8-12 men to clean one set of pans in approximately 8 days. This new procedure made possible an increase in salt production of several tons per day.

**7. Water well stimulation:** In a Midwest plant manufacturing soaps and vegetable oil shortening, the water well had decreased in production until it would go dry in less than one minute of pumping. Following acidizing treatment the well produced 504 gpm. with 10 ft. drawdown.

**8. Process side of $CO_2$ absorber and reactivator:** In the process, $CO_2$ is

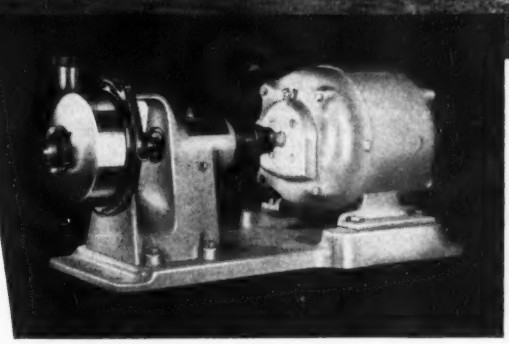



Shown on the job in *natural, sparkling clean condition* is a typical modern dairy conveying line complete with Tri-Clover Sanitary Stainless Steel Valves, Fittings, Tubing and a Sanitary Centrifugal Pump. This is the type of Tri-Clover set-up that makes it easy for the dairy industry to maintain high quality and meet exacting 3A Standards. This is the type of conveying line that makes it easy for you in the food and beverage industries to meet *your* local sanitary codes.

Features like sweep ell construction—clean cut, accurate threads—and highest quality materials and fabrication—these are the features that you need and want for your replacement or new line needs. These are the features that you get in a Tri-Clover installation!

And another important thing, Tri-Clover is equipped to handle your complete job from "tee to angle cock—from centrifugal pump to magnetic trap." *You can depend on Tri-Clover as your one reliable source for all types of sanitary fittings, valves, pumps, tubing or allied specialties.*

See Your nearest TRI-CLOVER DISTRIBUTOR
EXPORT DEPARTMENT, 8 So. Michigan
Chicago, U.S.A., Cable: TRICLO, CHICAGO



Shown above is one of the complete line of Tri-Clover Sanitary Centrifugal Pumps designed especially for use in the Dairy and Food Industries. These modern, high efficiency units are backed by years of specialized experience. For full details, send for the new Tri-Clover Sanitary Pump Catalog.

LADISH CO.
*Tri-Clover Division*
KENOSHA WISCONSIN
TRI-CLOVER

THE Complete LINE

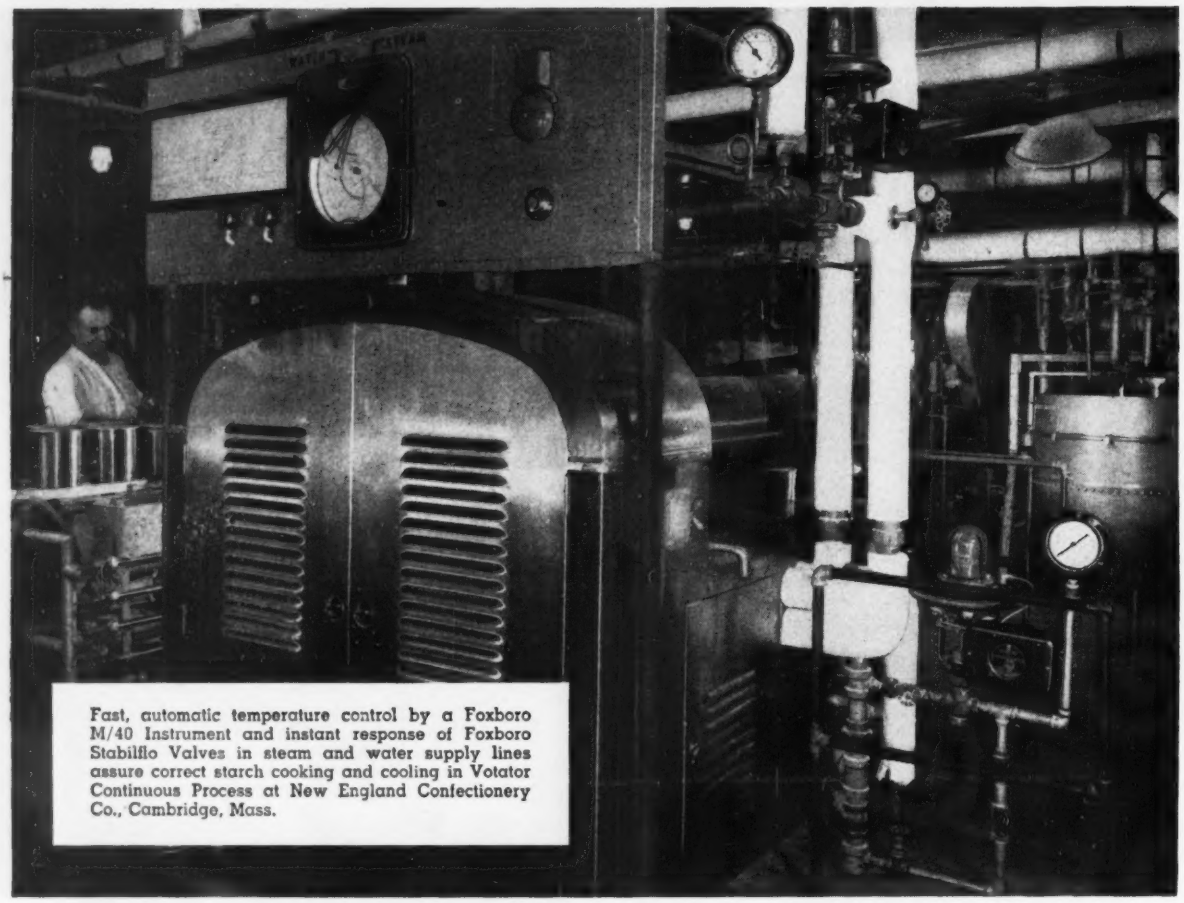
P354



For more information, use coupon on last page.

# Necco* CUTS COOKING TIME FROM 3/4 hr. to 2 min.!

## ...with Foxboro-controlled Continuous Process



Fast, automatic temperature control by a Foxboro M/40 Instrument and instant response of Foxboro Stabilflo Valves in steam and water supply lines assure correct starch cooking and cooling in Votator Continuous Process at New England Confectionery Co., Cambridge, Mass.

Precise Foxboro Control on equipment permitting a higher cooking temperature has enabled the New England Confectionery Company to switch from batch to continuous processing of starch jellies . . . with a 95% saving in cooking time.

This rapid process, which also greatly improves gel strength, shelf life, and clarity, is carried out in a Votator Heat Exchanger†. A sensitive, fast-acting Foxboro M/40 Controller maintains pre-set cooking and cooling temperatures by automatically adjusting valves in the steam and water supply lines. Regardless of changes in steam, starch, or water flow, the M/40 Controller holds critical temperatures *exactly* . . . protects the uniformity and quality of up to 4000 lbs. of starch jelly per hour.

Many other food processors now depend on Foxboro Control Systems to maintain premium product quality at lowest operating cost. Write for information on better control for *your* process.

*Reg. U.S. Pat. Off.
†Manufactured by The Girdler Company, Louisville, Ky.

THE FOXBORO COMPANY, 307 NEPONSET AVE., FOXBORO, MASSACHUSETTS, U.S.A.

FOXBORO
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INSTRUMENTS THAT IMPROVE PRODUCT UNIFORMITY

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

absorbed from flue gas by an amine. Later, it is released by heating the amine in a reboiler. Entire system, consisting of 20 exchangers, several towers, and reboilers, had developed an iron oxide deposit varying in thickness from ⅛ to ¼ in.

In chemically removing iron oxide deposits, elevated temperatures are required. Consequently, after amine was drained to storage tank, system was flushed with hot water to increase temperature to 175 F. Since the tank is steel and the deposit is iron oxide, the system was cleaned with an inhibited acid solution (non-toxic inhibitor). Acid was alternately circulated and soaked for 6 hr. This was followed by a water rinse and then a 1% soda ash rinse. Results were highly satisfactory.

**9. Product deposit in corn syrup manufacture:** In the process of bottling corn syrup in a Midwest plant, solid particles were noticed in the filled bottles. Examination of supply tank and 2 and 3 in. lines to bottling machines revealed an oxidation product buildup. Problem was eliminated by mixing hot alkaline detergent solution in supply tank and circulating through piping system, followed by water rinse.

**10. Steam supply for preparing intravenous foods:** A food plant making intravenous foods was confronted with the necessity of cleaning a boiler that furnished live steam directly to process. Operator was concerned about chemical cleaning for fear of toxic residues and odors. Boiler was cleaned safely and effectively using hydrochloric acid containing a non-toxic inhibitor. Following a 5 hr. soak, acid was drained to waste, boiler was flushed twice with water and then boiled with dilute alkaline solution. Then the boiler was opened up and all loose sludge that had come down was meticulously washed out. Operation required about 12 hr. and was completely successful.

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End (Resume reading on page 60)


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**Proved Protection**

**COPELAMETIC**

THE *Accessible* HERMETIC

For pre-cooling, freezing or storage, many large processors depend on practical COPELAMETIC refrigeration units. In an industry where low-cost operation and continuous unfailing performance are vital, COPELAMETIC has earned top recognition.

Copeland's design leadership has drastically reduced maintenance, by eliminating all belts, seals, and manual oiling from COPELAMETIC. And Copeland added accessibility! Should the rare need arise, the unit can be serviced instantly, on the spot. No unnecessary shutdowns, no sending back to the factory.

COPELAMETIC runs, quietly, economically . . . gives consistent high BTU for minimum cost. There are self-contained and remote units for every application.

WRITE FOR BULLETIN C-54

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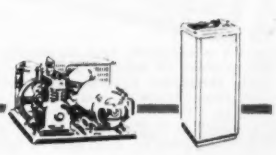
DEPENDABLE Electric REFRIGERATION



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# Questions & Answers

## THIS MONTH'S PROBLEM

### Measuring Viscous Product

*Question—In mixing one of our products in large batches, we use several hundred pounds of a viscous ingredient that is withdrawn, as needed, from large holding tanks. This ingredient is so heavy in consistency that it cannot readily be metered by the available sanitary or easily-cleaned, displacement-type meters, with which we are familiar. We are forced to gage the product out of large holding tanks, using calibrated marking, but we know this method is not accurate. We would like to find a better way of measuring out this ingredient, and would prefer a weight method if possible to compensate for differences in specific gravity.*

## MAY PROBLEM

### Color Changes in Cherries

*The Question Was—We've got the baffling problem of having our sour cherries lose their red color during processing and freezer storage. Do you know the cause?*

Answer—This discoloration is most noticeable after frozen cherries have been thawed prior to use. And it has resulted in downgrading of large quantities of cherries, with acccompanying financial loss to growers and processors.

Apparently, little is known about the nature and cause of this discoloration.

We do know that researchers at the New York Agricultural Experiment Station, at Geneva, N. Y., are presently studying the relationship between naturally occurring compounds in sour cherries and discoloration of processed cherries. They are attempting to isolate and identify the compounds responsible for normal and abnormal coloration of the fruit. Too, they are studying the enzymes responsible for discoloration.—The Editors.

### Another Answer

"Cherries, like most fruits with a low ascorbic acid content, are subject to browning and loss of flavor during freezing and thawing. This discoloration is caused by oxidation—air reacts with enzyme flavor constituents.

"Most satisfactory method to prevent this browning is to add 175-200 mg. of ascorbic acid (vitamin C) to 12 oz. of fruit. Ascorbic acid may be added to syrup or sugar, depending upon whether the cherries are syrup or sugar packed.

"If the wet pack is used, syrup should be of about 60-Brix density for best results.

"Since ascorbic acid begins to work immediately when applied to fruit, it is important that the cherries be frozen as quickly as possible to minimize oxidation prior to freezing."—*FE Reader.*

### Corroding Condensate Line

*Question—For our cannery operations, we generate steam in what we feel to be an efficient boiler plant run by an experienced operating engineer. One feature, however, is causing us considerable trouble and expense—that is, corrosion in our condensate-return lines, which necessitates replacing the pipe after an unreasonably short operating life. Can you offer some suggestions for corrective measures?*

Answer—Commonest cause of condensate-line corrosion is presence of carbon dioxide in the steam. This gas dissolves in the condensate to form carbonic acid, which is the actual corrosive agent. Remedy is elimination of carbon dioxide before the steam enters the pipes, neutralization of the carbon dioxide, or protection of the pipeline surfaces in some manner.

To begin with, make sure your boiler feed-water deaerator is functioning at full efficiency. This helps rid the carbon dioxide initially present in the water and, incidentally, oxygen as well.

Next, make certain you are removing as much bicarbonate hardness from the water as practicable, by chemical softening or an ion-exchange process. Reason is that the bicarbonates break down to form carbon dioxide.

If these measures are inadequate, feed volatile neutralizing agents into

### How Would *You* Do It?

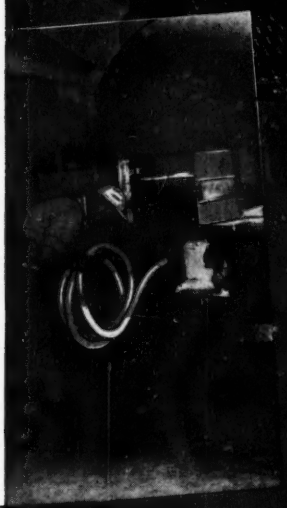
**Readers are invited to submit to FOOD ENGINEERING answers to "This Month's Problem."**

**Selected answers will be published with credit (unless you specify otherwise). We pay space rates.**

**What is *Your Problem?***

**Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.**

**Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.**



# Pipe liquid foods safely through *clear · flexible* TYGON PLASTIC TUBING

*Less expensive than stainless steel,* corrosion-resistant TYGON combines the best features of both rubber and glass *without* the disadvantages of either . . . the perfect piping for transmission of liquids or semi-solids!

Even the most sensitive foods as milk and ice cream are handled safely by chemically inert, non-toxic TYGON, without loss of taste or color. And flexible TYGON gives you the *solution visibility* of clear glass, without danger of breakage, cracking, or crazing. You have complete visual control of flow . . . a quick glance instantly tells you the level of your process material.

- MILK
- PIE FILLING
- ICE CREAM
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Fully flexible TYGON reaches from "anywhere to anywhere" — with less fittings, and less installation time. Lightweight, strong and abrasive-resistant, TYGON is a "natural" for your portable hose or tubing applications.

**TYGON CUTS MAINTENANCE COSTS IN HALF!**

A TYGON line can be dismantled, cleaned, and reassembled in minutes. TYGON'S mirror smooth surface flushes easily clean. There is no crazing or checking to harbor bacteria. Strong detergents and cleaning chemicals leave it unaffected. It can even be steam sterilized, if desired.

TYGON TUBING comes in continuous lengths and in various [illegible] Also available with braided reinforcement fabric for pressures up to 300 psi.

U. S. STONEWARE
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PLASTICS AND SYNTHETICS DIVISION

225-D

**WRITE TODAY** for Bulletin T-77 which gives you full particulars on money-saving TYGON Tubing.



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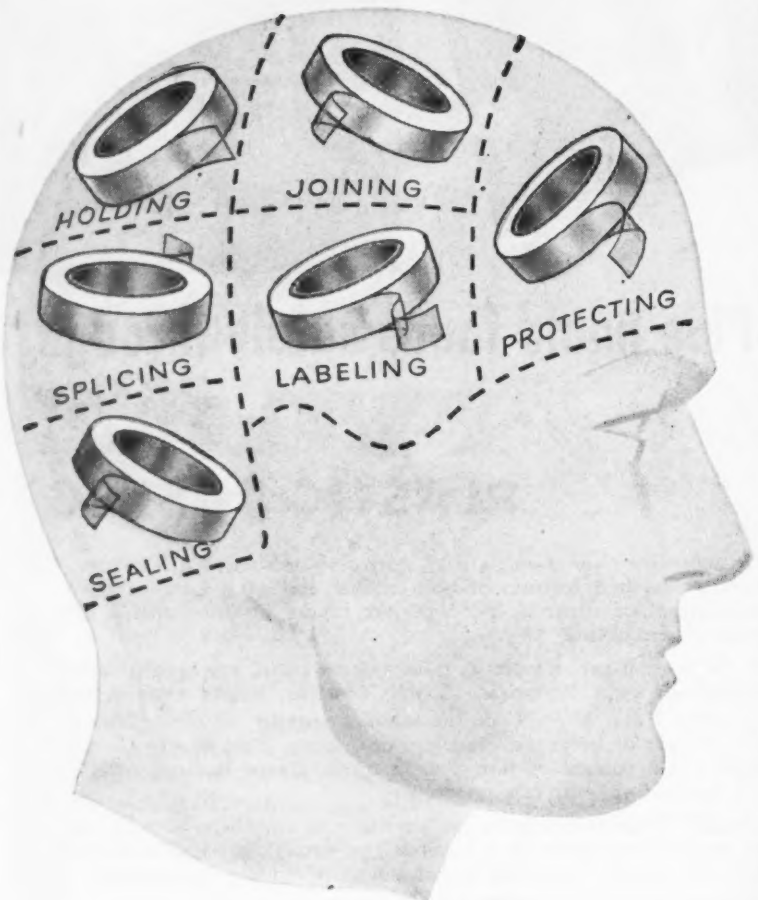
# When you think of saving...
# Think of TAPE!




Famous "Scotch" Brand Cellophane Tape is a time-saving, money-saving tool all over the plant! Remember, it's crystal clear and sticks at a touch—tighter than ever before. Use it for holding, joining, protecting—any of a thousand different jobs. Tape does it faster, better, cheaper! For more information, write on your letterhead to Dept. FE-74.

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3M COMPANY

# *LOOK what you can do with it!*

**NEAT PACKAGING** of irregular shapes is easy with "Scotch" Brand Cellophane Tape. This meat-packing example shows how well tape performs on refrigerated package.

**ADD PREMIUMS** to regular shelf packages quickly, easily, inexpensively. This tape-of-all-work sticks at a touch to any clean, dry surface — holds securely in transit and on shelves.

**CARTON CLOSURES** that *stay* closed are easily applied. Example: sealing bulk packages of butter pats with clear-as-glass "Scotch" Brand Cellophane Tape. Tape doesn't hide printed message; holds cover securely.

**AIR-TIGHT SEAL** keeps potato chips fresh and saleable for long periods—one of the hundreds of profit-making, money-saving uses for versatile "Scotch" Brand. Get a packaging problem? Think first of *tape*.

the steam to keep pH of the condensate out of the corrosive range. Such practice requires extreme caution, however, and guidance of an expert in water-treatment problems. This is especially true if you use any steam in direct contact with your product, as is quite likely to be the case in a cannery.

Finally, there is the possibility of feeding a film-forming chemical into the system, which will surface-protect the interior of the pipe. Here, too, the nature of your business dictates caution and expert guidance.

In final analysis, it probably will be the economics of the question that will determine your best course of action. Most complete protection may turn out to cost so much that you will prefer to continue your present maintenance program. On the other hand, you may find that a moderate expenditure for improved water treatment may reduce your maintenance expenses to a very low level.

**Q.–What wrappers would you suggest using for frozen breads?**

**A.–Look into the possibility of using heavy-duty wax paper, noncracking (at low temperature) cellophane, or the new polyethylene-coated bread wrapper.**

**You might consider a new approach –packing loaves in cartons that would stand the abuse inflicted on frozen items during handling.**

### New Banana Ripener

*Question—Someone told me that there is now a better and safer way of ripening bananas than the hazardous ethylene chamber-technique. Have you any information on it?*

Answer–USDA researchers have found that the weed killer 2,4-D (2,4-dichlorophenoxyacetic acid) shows promise of replacing ethylene gas.

These scientists found that bananas, sprayed or dipped in a 250 to 500-ppm. solution of 2,4-D, ripened 3 to 8 days sooner than naturally ripened fruit (in presence of gases–mostly ethylene–given off by the bananas).

Too, the 2,4-D-ripened bananas were sweeter and more uniform in color. Much of the flavor difference was in sugar content–10-20% for 2,4-D-ripened fruit vs. 7-8% for the naturally ripened.

One thing bad about the new treatment is that 2,4-D does not get along well with ethylene or natural gases from ripening bananas. But there's a solution–ventilating the storage room and spraying a mist of water into it to prevent bananas from losing moisture.


# "magic carpet"

## TO UNIFORM PRODUCT QUALITY

The results may not show on your package label, but W&T Merchen Scale Feeders with continuous weigh-belt for weighing and feeding in one operation — can help to maintain uniform high quality in final product.

Precision scaled, durably constructed and simply controlled, W&T Merchen Scale Feeders deliver minute to minute accuracy whether feeding only a few or many thousands of pounds per hour. In modern food processing operations — premixing, batching and continuous blending — this exacting accuracy is a requisite. As further assurance of uniform quality, the Feeder may be synchronized with other equipment to shut-down automatically in the event of any equipment or supply failure.

If you have a food processing problem requiring uniform feeding and control — automatically by weight — communicate today with Wallace & Tiernan. Your inquiry will receive prompt attention without obligation.

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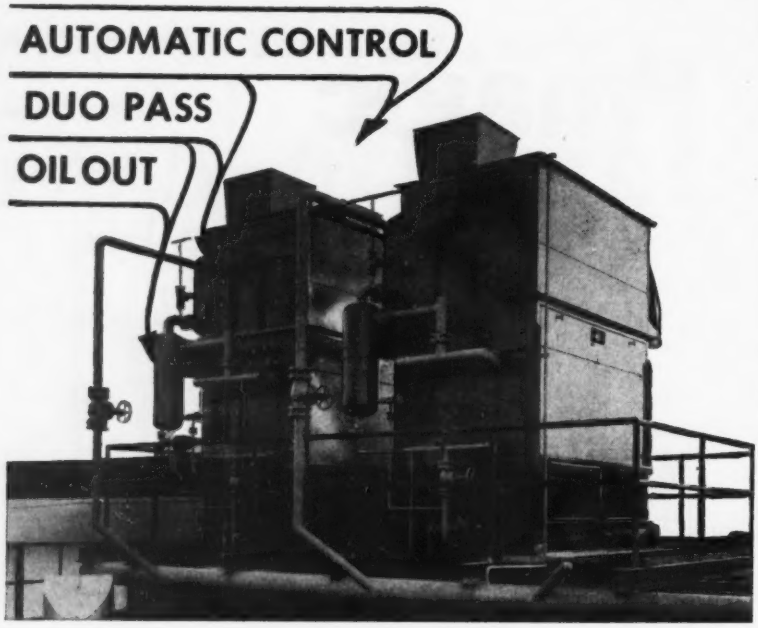



## SAVE HALF THE ENGINEER'S TROUBLES ...WITH A REFRIGERATION PLANT

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

*"The Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.*

*The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.*

*The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!*

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

*Write for Bulletin 103; Address Dept. F.I.*

*You can see one of these installations near you.*

**NIAGARA BLOWER COMPANY**

**405 Lexington Ave. New York 17, N. Y.**

*District Engineers in Principal Cities of United States and Canada*

### Brownies Dry Out Quickly

*Question—I am interested in marketing a brownie, but find that the chief problem lies in its drying out in a very short time. Is there a solution to this problem? And can you provide me with a couple of formulas?*

Answer—Not knowing your formula, we can only guess that drying of the brownies is probably due to absence of invert sugar. This sugar is actually a combination of two sugars—levulose and dextrose. It is hygroscopic (attracts and retains moisture)—just opposite to the properties of granulated sugar that gives off moisture and thus results in drying of the brownies.

Levulose also possesses another good property. It resists crystallization and prevents crystallization of other sugars.

Here are a couple of formulas you might try:

*Coconut Chocolate Chip Brownies*—Beat until light, 15 oz. of eggs, ½ oz. of salt, and 5 oz. of invert sugar. Add, at slow speed, water (100 deg. F.), 4 oz., and vanilla, ½ oz. Sift together 17 oz. of cake flour and ½ oz. of baking powder, then add and mix until uniform. Slowly add 7 oz. of melted chocolate. Introduce and fold in by hand 13 oz. of shredded coconut and 18 oz. of chocolate chips. Spread batter evenly on sheet pans and liberally coat with coconut. Bake at 350 deg. F., cool, remove from pans and cut to 1½x3-in. size.—*Formula by Franklin Baker Div., General Foods Corp.*

*Nut Brownies*—Mix to a smooth, fairly stiff batter: Sugar (fine granulated), 20 lb.; Nulomoline (invert sugar) 4 lb.; shortening (part butter), 12 lb.; salt, ½ lb.; eggs, 12 lb.; nuts (large size), 10 lb.; flour, 10 lb.; cocoa, 5 lb.; vanilla, as desired; and milk, sufficient to make a smooth, fairly stiff batter. Bake in sheet pans, cool, and cut to size.—*Formula by Nulomoline Div., American Molasses Co., New York.*

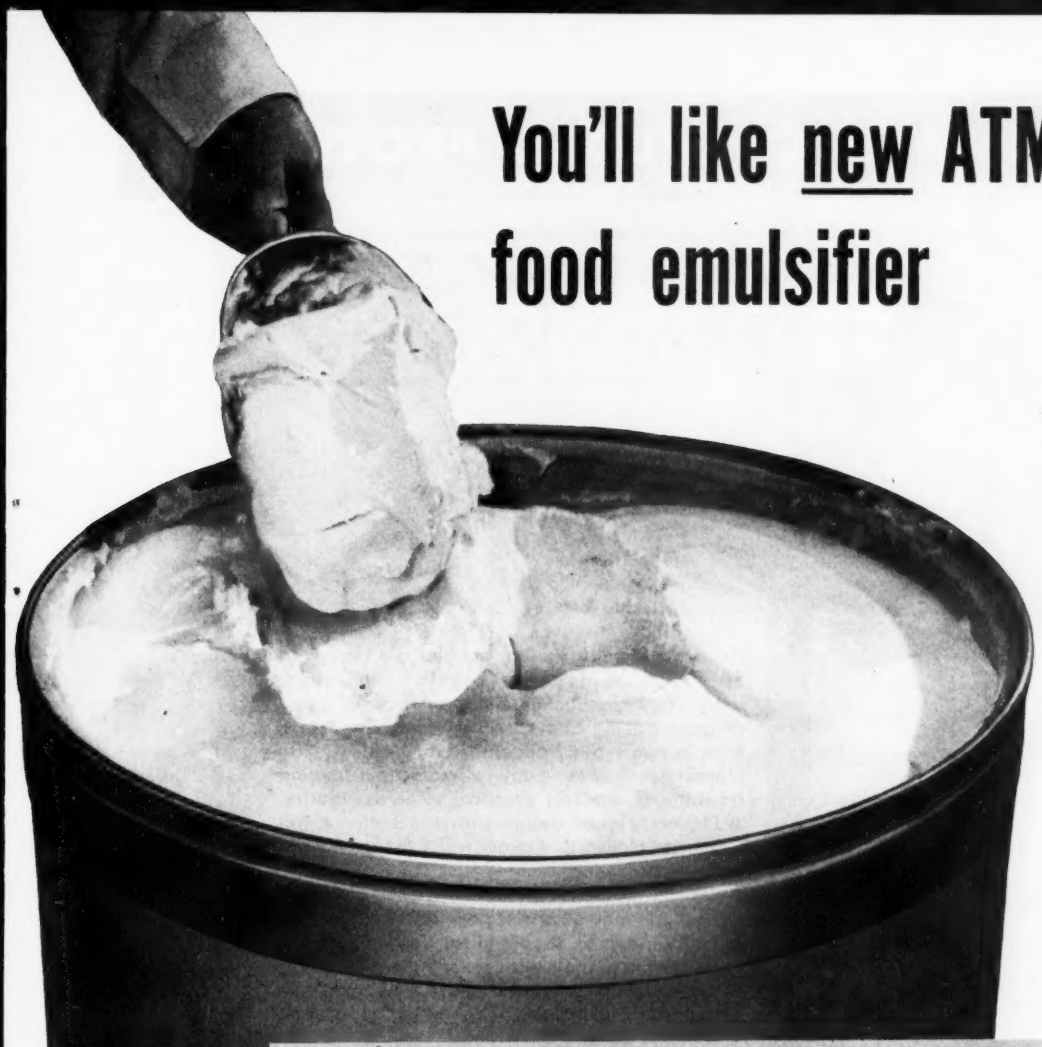
**Q.—What's responsible for the brown stains on our brined cauliflower?**

**A.—Avoid contact with iron during processing. When present in brine, iron reacts with tannins in the cauliflower to form iron tannates (brown) on the vegetables.**

### Selecting Cellophane

*Question—We are considering putting out frozen fish in cartons, and would like to provide cellophane protection. There are so many grades and types of cellophane that we are not sure just what one, or ones, would be*

# You'll like new ATMUL® 82 food emulsifier



**Creamed by a continuous tempering process,** Atmul 82, a balanced mixture of mono- and diglycerides, is now better than ever. You'll like its richer appearance, its smoother texture. You'll appreciate the ease of scaling. New Atmul 82 never separates . . . its fine crystal structure is accurately controlled to give you perfect uniformity on every shipment.

Bread baked with Atmul 82 gains greater consumer acceptance, through its long-lasting softness and palatability, tender crust and fine-textured crumb. Atmul 82 is distributed to the baking trade by R. T. Vanderbilt Co., Inc., of New York. Manufactured by Atlas . . . pioneers in the production of food emulsifiers . . . it is also used advantageously as an ingredient in shortenings, prepared mixes and bakers' specialties. For samples and technical information, write or call Atlas today.

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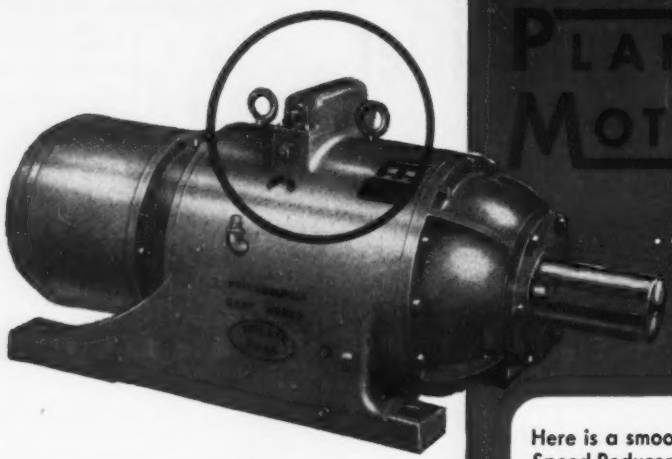
# . . FOR INSTANT OVERLOAD PROTECTION



## PLANETORQUE MOTOREDUCER

. . . eliminates
shear pins,
electrical relays . . .

Here is a smooth running, trouble-free Motorized Speed Reducer . . . an "exclusive" product, whose design and construction is the result of 61 years of gear making and speed reducer experience. Built in two types, Horizontal and Vertical. The MotoReduceR has many original, outstanding advantages, each of practical value to industry:

- Planetary gear design provides better alignment of pinions and gears, which in turn reduces noise and wear.
- Permits greater reduction ratios in more compact unit than otherwise possible.
- Reducer can be readily disassembled for easy inspection or maintenance.
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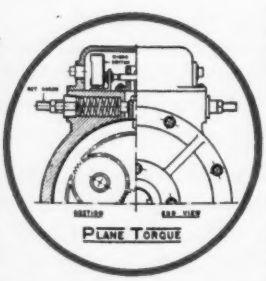
PLANETORQUE




PLANETORQUE is a feature that can be supplied with any Philadelphia MotoReduceR or Philadelphia Planetary Reducer. It safeguards both the driven machinery and drive unit from dangerous overloads. These units are widely used on stoker drives, conveyor drives, mixers, agitators, roll drives, and tumblers, where overloads or jamming may be encountered.

For further detailed information write for PlaneTorque MotoReduceR Catalog.

# Philadelphia Gear Works, INC.

**ERIE AVE. AND G ST., PHILADELPHIA 34, PA.**

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

*Industrial Gears and Speed Reducers*
*LimiTorque Valve Controls*

*best to use. Could you give us some suggestions for our guidance?*

Answer—We assume that you will want to wrap the fish itself in cellophane before placing it in the cartons, and that you will want to overwrap the cartons. For the inner wrap, a non-heat-sealing, moistureproof cellophane will be adequate, in a 300-gage. This makes an excellent transparent wrap which is satisfactorily resistant to the wet product.

For the outer wrap, it would be desirable to use a heat-sealing type of cellophane which would give protection against moisture loss. Such a film, in either 300- or 450-gage, will provide a strong heat seal and a moisture-proof barrier which is well suited to this application and is much used commercially.

We suggest that you consult suppliers of these materials in order to secure the minimum cost material that will afford satisfactory protection. They can also give you information on correct temperature and humidity conditions for in-plant storage, and advise you on such matters as printing the over-wrap if desirable.

### Making Butterscotch Syrup

*Question—Can you furnish me with directions for making butterscotch topping?*

Answer—Dissolve ½ oz. of bicarbonate of soda in 4 oz. of water, and then introduce into steam-jacketed kettle along with 18 lb. of Sweetose (enzyme-converted, 43 deg. Be. corn syrup) and 2½ lb. of sweetened condensed whole milk. Cook batch, with agitation, to 245 deg. F., or until desired color has developed.

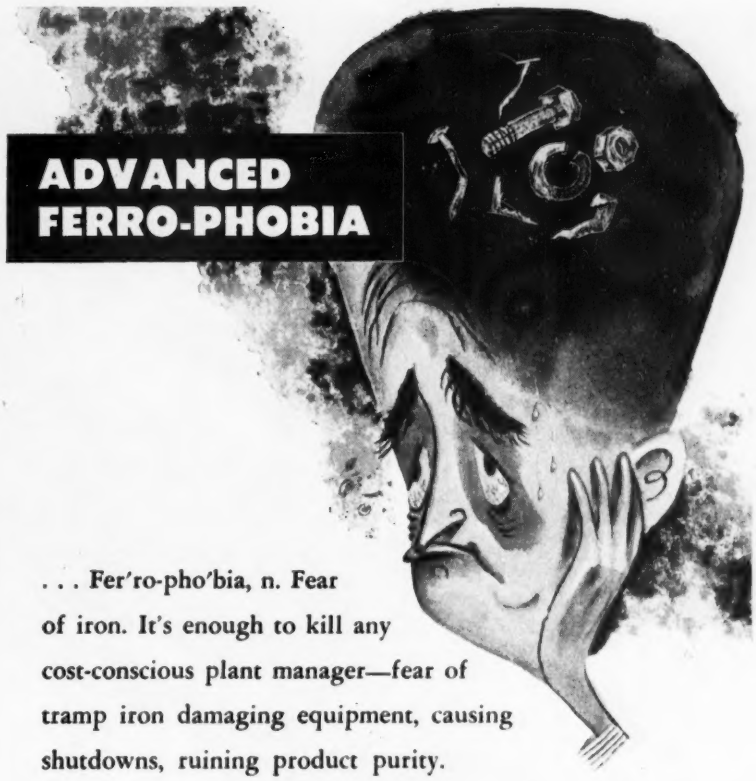
Now dissolve 2 lb. of brown sugar (medium yellow or golden brown) and 2½ oz. of salt in ½ gal. of water, immediately add to batch, and mix until smooth. Then cook batch to 222 deg. F. Turn off steam, add and mix in well 1 lb. of butter, ¼ oz. of lecithin (Sta-Sol), and flavor to suit. Run through homogenizer, and seal into containers at 180-190 deg. F.—*Formula from A. E. Staley Mfg. Co., Decatur, Ill.*

**Q.—Is there any advantage to slicing frozen bread?**

**A.—No. There's a greater danger of drying of the sliced loaf due to moisture losses.**

### Sugar Crystal Size

*Question—In trying to determine best types of sugar for our several confectionery products, we have encoun-*


. . . Fer'ro-pho'bia, n. Fear of iron. It's enough to kill any cost-conscious plant manager—fear of tramp iron damaging equipment, causing shutdowns, ruining product purity.

No couch can cure it, but a Dings Magnet can. When ferro-phobia symptoms—unhappy people moaning about lost production — show up in your plant, phone your representative or write Dings. They'll prepare an effective magnetic Rx, backed by 50 years of experience, that will end the plague in a hurry.

We Wiped Out the Plague in Texas — With this "super" 3-stage magnetic hump built for one of the nation's biggest plastic manufacturers. It separates iron contaminated polyethylene pellets from iron-free pellets.

Powerful, non-electric Dings Perma-Plate magnets stop iron in the hump, chutes or ducts. Magnetic strength guaranteed forever.

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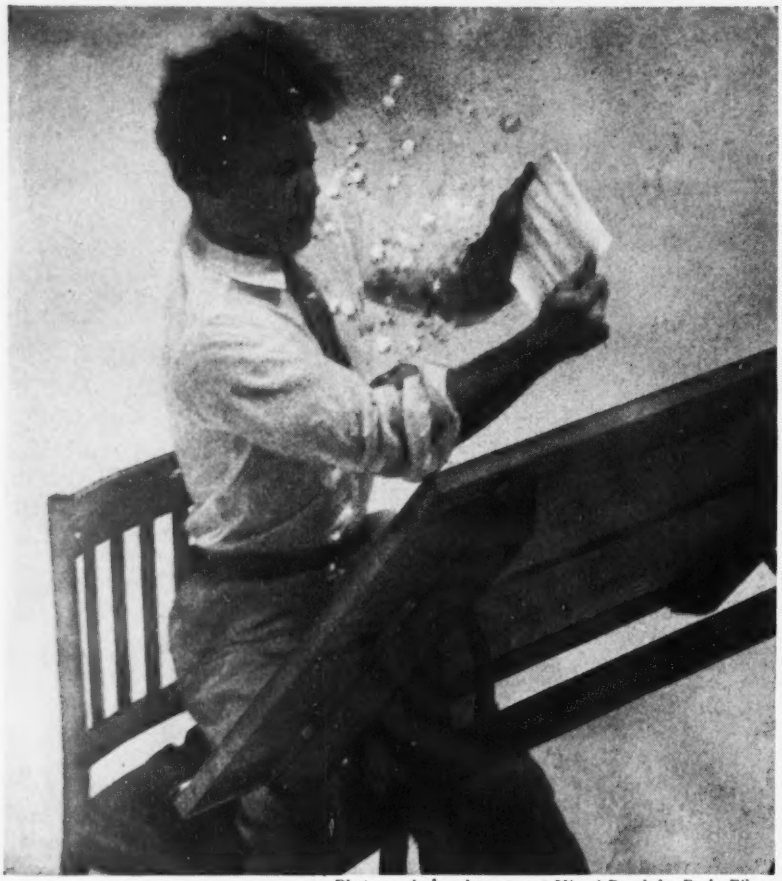

*Photographed underwater at Miami Beach by Reela Films*

# Package Designer makes Patapar underwater test

It isn't necessary to move your drawing-board underwater to discover what designers of food packages have known for years – that Patapar Vegetable Parchment has amazingly high WET-STRENGTH. You can soak Patapar for hours and hours – you can even boil it – but Patapar *still* stays strong.

**Patapar resists grease too**

Patapar resists the penetration of fats, oils and grease just as effectively as it stands up in water. These qualities make it ideal as a food wrapper and for many other uses. And – Patapar is NON-TOXIC.

**Some of Patapar's many uses**

Patapar is produced in different types of variations that meet all sorts of exacting requirements. Some of its diversified uses; wrappers for butter, poultry, margarine, ham, bacon, milk can gaskets; rubber and plastic releasing separators; white print translucent masters for direct print machines; dialyzing membranes; in hospitals for wrapping articles to be sterilized in live steam. It is furnished in rolls or sheets, plain or beautifully printed with colorful designs.

**In your business** perhaps there is a job that could be done better with Patapar. Tell us about it, and we will send information and testing samples of the type of Patapar we recommend. Write today.

**Patapar®**
**Vegetable Parchment**
HI-WET-STRENGTH · GREASE-RESISTING

PATERSON PARCHMENT PAPER COMPANY
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*350 Bryant Street, San Francisco 7*
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**HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885**

*tered such terms as "fine", "coarse", etc. Are there any commonly accepted standards or definitions in the industry to indicate what these mean in terms of actual crystal sizes?*

Answer—If there are any such standards, we are unaware of them. It appears that there are a set of descriptive terms in the trade, but we do not believe that actual screen analyses or the like have been agreed upon to define them.

Granlated cane or beet sugars include:

*Ultra-fine*—for confectionery pan goods, dessert powders, cake mixers, etc.

*Very fine*—for mixing with other fine solids, as in making gelatin dessert powders, etc.

*Fine*—this is more or less a "regular" sugar for general use.

*Medium coarse*—for crystallizing syrups and fondant-making. This resists color formation in high-temperature cooks.

*Coarse*—may be used for somewhat the same purposes as the preceding.

Powdered sugars include:

*Ultra-fine (confectioners 6X)*—for uncooked fondants and certain confectioner's coating. Usually contains cornstarch to prevent caking.

*Very fine (confectioner's 4X)*—for lozenges, chewing gum, marshmallow, chocolate, finish coating in panning. Usually contains small amount of cornstarch to prevent caking.

*Medium and coarse*—for dusting purposes, where other powdered sugars are too fine.

### Safe Performance of Kettles

*Question—Please advise what precautions we should take to insure safe operation of steam-jacketed cooking kettles.*

Answer—For full details, we would suggest that you present your problem to your insurance carrier to get a recommended procedure from the carrier's safety engineer. However, we offer these general tips on safe operating conditions:

1. Provide each kettle jacket with a safety pop valve, set for the operating pressure recommended by the kettle manufacturer. Be sure to locate it so that any steam blown off by the pop valve cannot reach the operator.

2. Make sure that power agitators are set with proper clearance, so that friction will not rub thin spots on the inner shell.

3. Try to use a soft material for

**Q.–What's the maximum time required to defrost frozen baked goods?**

**A.–About 2 to 4 hr., and without use of heat.**

PREPARED MEAT PRODUCTS can be made notably more appetizing through the use of VIANDAROME* SEASONINGS — stable, uniform flavor additives in measurable, easy-to-incorporate liquid form. VIANDAROME* SEASONINGS can be modified to meet the precise taste preference of the individual manufacturer — an exact seasoning effect always available once its formula has been established and recorded. It's a dependable flavor if it's made by FRITZSCHE . . . *A FIRST NAME IN FLAVORS SINCE 1871.*

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*Brothers, Inc.*

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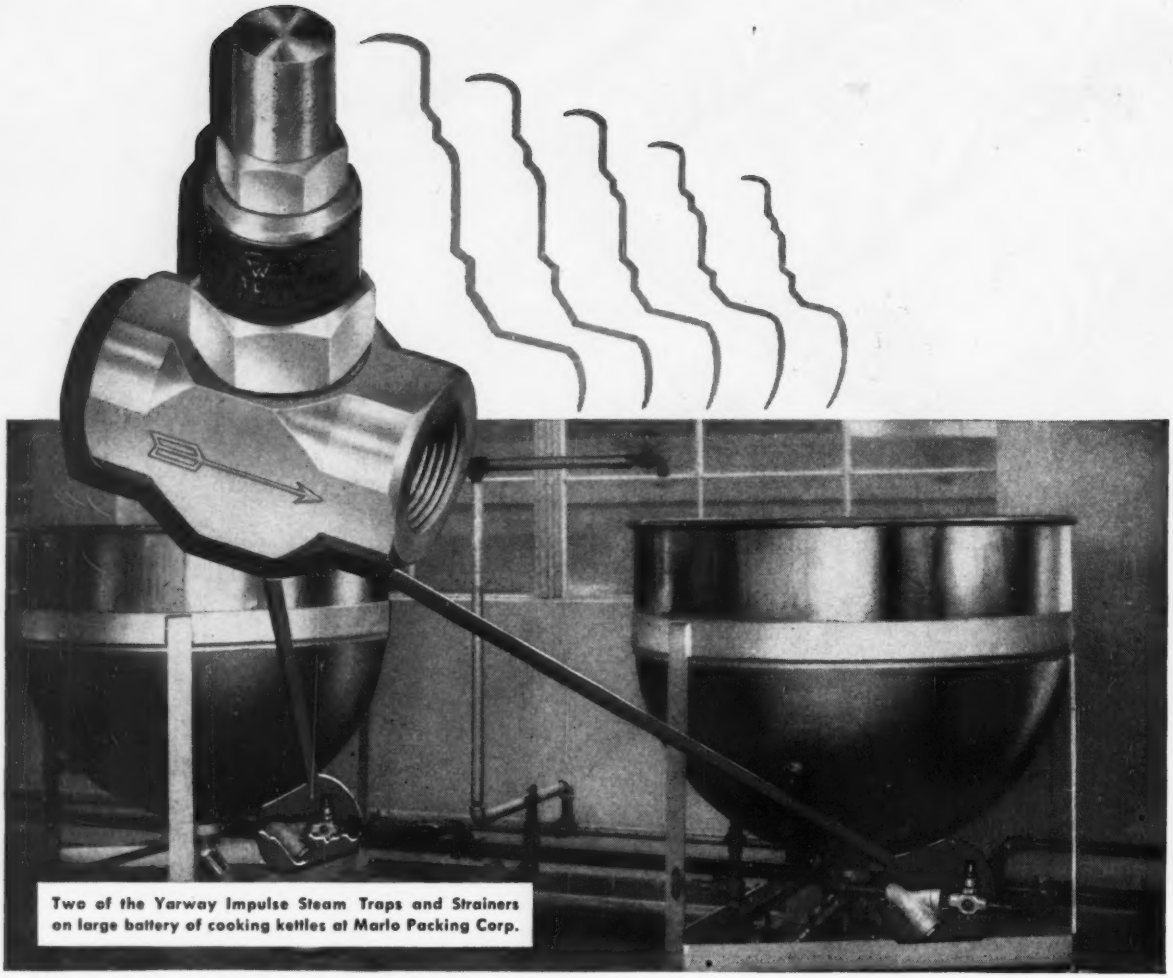
# THEY'RE ONLY AS GOOD AS THEIR FLAVOR!

*Reg. U. S. Pat. Off.



Two of the Yarway Impulse Steam Traps and Strainers on large battery of cooking kettles at Marlo Packing Corp.

# YARWAYS make it (hot) for "Chili"— over 6 years

Marlo Packing Corp. in San Francisco is famous for chili con carne.

Six years ago they installed Yarway Impulse Steam Traps and Strainers on all cooking kettles to get that chili *hot in a hurry.*

The Yarways did just that.

Today—6 years later—they're *still* doing it . . . the same traps, with not even a spare part added!

That's evidence of the service you can expect from Yarway Impulse Steam Traps.

Only *one moving part* in a Yarway Impulse Trap—a small stainless steel valve. It *floats on the condensate load,* discharges condensate as it forms, keeps heat at the peak!

Other advantages—small size, lightweight, low cost, stainless steel body and parts, quick delivery from 250 local distributors. For name of nearest one, and free trap catalog, write . . .

**YARNALL-WARING COMPANY**
127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY

## impulse steam traps

*and Yarway Fine Screen Strainers*



For more information, use coupon on last page.

the construction of the paddles, if manual stirring is necessary.

4. See that each jacket is given a proper hydrostatic-pressure test in accordance with procedure recommended by manufacturer. It is generally considered good practice to make such a test at least once a year. But if the kettles operate double shifts, or the service is severe, six-month or even three-month intervals are better.

You may wish to return the kettles to the manufacturer for testing, provided you can spare them long enough. Otherwise, you can carry out your own testing. To do it, plug all jacket openings but two, and fit one of the remaining openings with a pressure gage. Connect the other opening with pressure hose to a suitable pump (often manually operated) capable of introducing water and developing an internal jacket pressure 50% higher than normal working pressure. When the pressure has been built up to this point, observe the gage for 15 min. or so, to see that the pressure holds. Meanwhile, the entire kettle is carefully inspected for leaks or bulges. Better results are obtained if testing is done with the kettle inverted.

—*End*—

## Centrifuged Product

—*Continued from page 63*

force develops a hydrostatic pressure in tons, against the bottom of the ring valve, thus keeping the slots safely closed.

At pre-determined intervals, this pressure against the ring valve is released. A tapered seat at the top of the ring-valve seal and facing the inside of the bowl permits the sludge in the bowl to exert a pressure against the ring valve, thus opening the slots wide for a complete, instantaneous sludge discharge into the sediment chute.

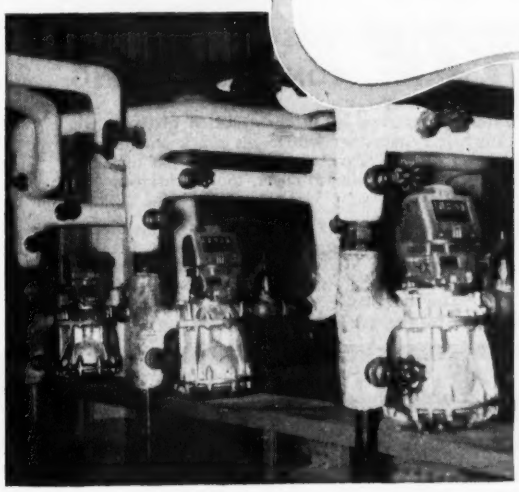
Inflow of wine is interrupted during the desludging operation for only a few seconds. After desludging, the water is again directed into the peripheral groove under the ring valve. The peripheral discharge slots are closed. Full scale centrifugal clarification of wine is resumed.

Amount of sludge solids present in the wine determines whether the desludging cycle should be spaced at intervals of a few minutes or as long as 75 min. Each discharge requires only small quantities of fresh water. Operating water is ejected separately from the bowl and will not contaminate either the incoming sediment-laden wine or the clarified product leaving.

The present machine was installed


***FOR ASSURED PRODUCT UNIFORMITY USE . . .***

# XACTO METERS



**There's no guesswork and practically no chance for human error when Bowser Xacto meters are used . . . delivery quantity can be predetermined . . . and then automatically shut off when completed.**

**Wherever extreme accuracy is an important requirement in the measurement or batching of liquid food ingredients . . . you'll find that Xacto meter can do the job easier and more accurately than you are now doing.**

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in our plant early in Nov. 1953, and then numerous tests on both recovery of wines from lees and in polishing were conducted prior to its regular use in production operation. Here are procedures and results of some of the tests:

Initial object was to determine efficiency of the centrifugal for roughing operation on lees. In Test 1, wine lees that would no longer flow were pumped to collection tanks and from there to the centrifuge. To move the lees, a Moyno pump having stainless steel and neoprene contact parts was employed. The lees were of Delaware type, and the quantity was 110 gal. Solids content was 40% by volume. Wine recovery amounted to 75 gal. with 3% solids. Process time involved was 35 min., with desludging intervals every 2 to 3 min.

In Test 2, wine lees that flowed easily were pumped to collection tanks, then to the certrifuge. Here, the type was Catawba and the quantity 1,400 gal. less from 17,658 gal. wine. Solids content was 25-50% by volume at various times during the pumping operation. Wine recovery amounted to 945 gal. with 1.67% solids. The machine was operated at a throughput of 650 gph. Desludging intervals varied from 2 to 4 min. Operating time was slightly over 2 hr.

Results of laboratory checks made during the run of Test 2 are given in our accompanying table. The following observations relative to production figures were made:

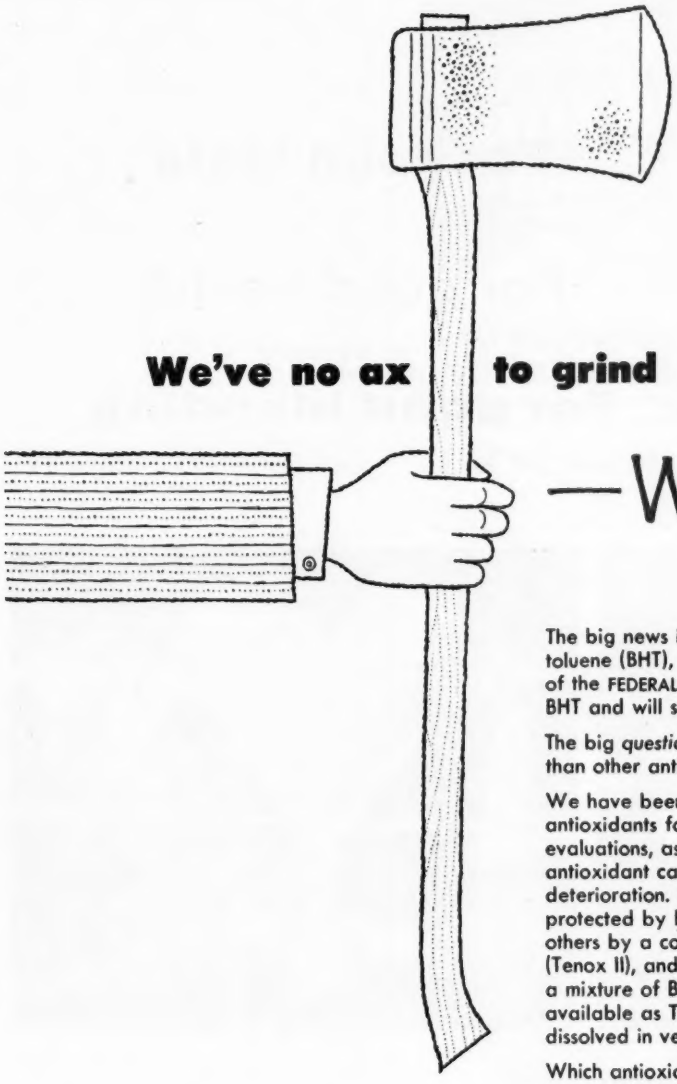
Catawba lees normally run 3.5%. Assuming a total run of 17,658 gal. of wine, 620 gal. of lees would have resulted. Centrifuging would reduce lees to 455 gal.–or a net saving of 165 gal. of wine that under former practice would have been lost.

In a further run here, designated Test 2a, the lees tank was not agitated prior to pumping to centrifuge. Speed varied from over 900 gph. (with desludging necessary at 45-min. intervals at the start of the operation, when fairly clear wine was encountered at top of tank) down to about 300 gph. (with desludging every 4 to 5 min. when heavy sediment was being pumped from the tank bottom).

Test No. 3 involved very heavy lees, with 3,500 gal. representing 4% by volume of 87,000 gal. of newly fermented Catawba wine. Solids content varied from 25 to 50% at various levels of the tub. Wine recovery amounted to 1,800 gal. averaging 1% solids. Desludging intervals ranged from 4 to 15 min.

On this test, the following observations were made relative to operating costs:

Labor was estimated at 40 hr. (2



## We've no ax to grind about any antioxidant

## —We sell 'em all!

The big news in food-grade antioxidants is butylated hydroxy-toluene (BHT), the use of which is defined in the May 20th issue of the FEDERAL REGISTER. Eastman is currently manufacturing BHT and will sell it as one of its line of Tenox antioxidants.

The big *question* is, "Where can it be used more effectively than other antioxidants?"

We have been evaluating BHT and comparing it with the older antioxidants for the past twelve months. The results of our evaluations, as you might logically expect, indicate that no one antioxidant can best protect every food against oxidative deterioration. Certain foods are most effectively protected by BHA alone (Tenox BHA), some by BHT (Tenox BHT), others by a combination of BHA, propyl gallate and citric acid (Tenox II), and some foods can best be preserved by a mixture of BHT and BHA, which combination we are making available as Tenox IV, containing 20% BHT and 20% BHA dissolved in vegetable oil.

Which antioxidant to use—how much to use—and how to use it—are problems which Eastman is peculiarly well equipped to answer.

We have no ax to grind about any antioxidant, for we sell them all. Our best and unbiased advice is available to you at any time. Behind this advice are years of experience and accumulated data, unmatched by any other manufacturer of antioxidants.

If you would like to explore the possibility of using BHT alone, or in combination, write to us—Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Kingsport, Tennessee.

**Tenox** Eastman Food-grade Antioxidants

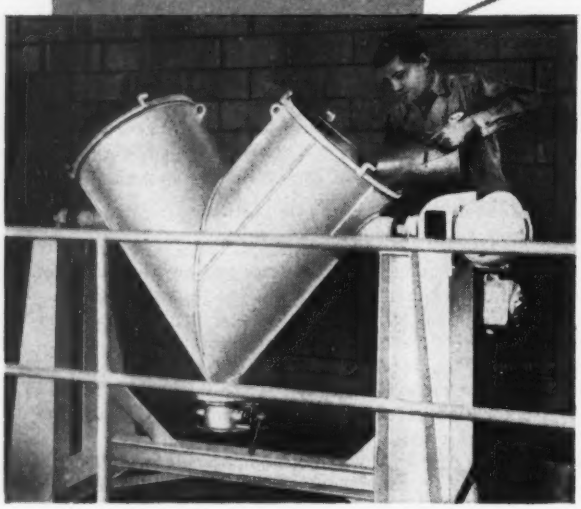
**SALES OFFICES: Eastman Chemical Products, Inc.,** Kingsport, Tenn.; New York—260 Madison Ave.; Framingham, Mass.—65 Concord St.; Cincinnati—Carew Tower; Cleveland—Terminal Tower Bldg.; Houston—412 Main St. **West Coast: Wilson Meyer Co.** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Salt Lake City—73 S. Main St.; Seattle—821 Second Ave. **Canada: P. N. Soden Co., Ltd.,** Montreal, Quebec—2143 St. Patrick St.; Toronto, Ont.—1498 Yonge St.

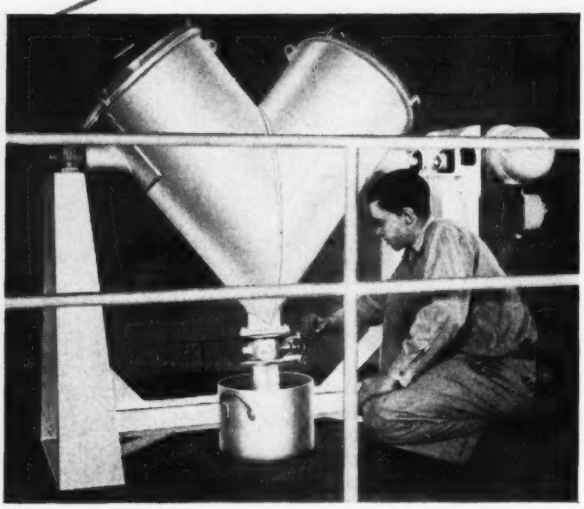
# For good taste

# For good health

# For good blending

Vitamins
$B_1$, $B_2$, Niacin and Iron





**Delicious Cream of Rice is a family favorite. Enriched with essential vitamins, it not only tastes good, but is good for you.**

Thorough blending of vitamins is, of course, imperative. A **p-k** 5 cu. ft. stainless steel blender*, equipped with intensifier bar*, effectively blends four basic vitamins—niacin, thiamine, riboflavin and iron compound. This is another example where the food industry has selected the **p-k** twin shell blender to precision blend these important vitamins.

Loading is simplified by quick opening, dust-tight covers. Discharge is rapid, too, with the pre-blended vitamins emptied directly into containers for subsequent blending with the rice. Its smooth baffle-free interior facilitates clinical cleaning.

The application of **p-k** twin shell dry blenders to your particular processes will assure efficient blending at low cost. Why not pre-test your materials in **p-k**'s special blending laboratory. Send a sample of your materials for a thorough blending analysis, or write for catalog 12, no obligation.

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101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 96-A Huntington Avenue, Boston 16 • and other principal cities.

men at 20 hr. each). Tasks involved were: Setting-up, operating, and cleaning the centrifugal, also putting away the centrifuged wine. Average lees of closely racked wine, estimated at 2 to 3%, indicates wine saving of at least 900 gal.

This is a saving of at least $750 for a labor expenditure of $60. Cost of operating the machine is termed negligible. The unit draws but 14 amp. at 220v. under steady operation.

In still another run, Test 4, 1,375 gal. of Delaware wine were centrifuged directly from the fermenter. In this instance, 1,335 gal. were obtained, compared with 1,325 gal. when racked by ordinary methods from the fermenter. And the lees discarded were reduced to 40 gal., or 2.9%, as compared with 50 gal., or 3.6%, by ordinary methods. Solids contents of the racked and centrifuged wines were indicated, about 0.6%.

In Test No. 5, 400 gal. of Delaware lees, solids content 43%, were run through the machine. In this run, 115 gal. of usable wines, solids content 0.3%, were recovered. The process time involved was 1½ hr. This wine would have been lost under normal racking procedure. Operating figures reveal a saving of at least $100 for an expenditure of less than $10 for labor and equipment.

Next, tests were run to determine efficiency of the machine on polishing operations. In the first of these, red wine fined with Sparkolloid and chilled was centrifuged, using a fine set of inserts to give a brilliant clarification at high gallonage production. Results revealed a finished wine running to approximately 95% bottle brilliance. During the operation, no clogging was noticed. And desludging was necessary only every 75 min. Operating speed was 800 gph. No problem with tartrates was encountered, though crystals were very small.

In the second of these polishing tests, newly fermented white wine, unsettled, was centrifuged at an operating speed of 650 gph. Desludging was needed at 45 min. intervals, and clarity obtained was classified as "good".

The treated wines from these two tests revealed only the usual change due to elimination of lees. There was no variation in color, aroma, or taste. Further, there was no evidence of oxidation or aeration of dry wines when passing through the machine, and chemical analysis proved the wines were identical before and after centrifuging. Metal pick-up was shown as nil in copper, and iron less than ½ ppm. All surfaces in the machine contacting the wine are constructed of 18-8 stainless steel.

*End (Resume reading on page 64)*

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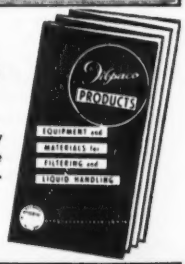


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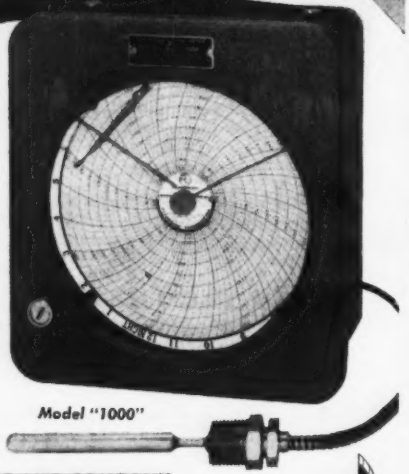

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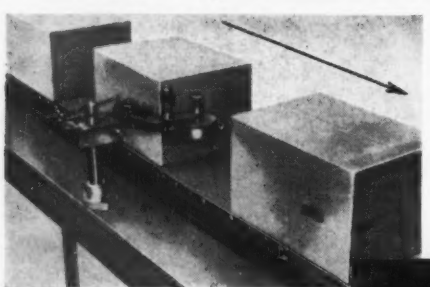
MARK ALL 4 SIDES OF CASES AUTOMATICALLY...*in a single pass*



New ROLACODER units attach to conveyor or sealer . . . imprint code-dates, lot numbers on all 4 panels of cases simultaneously . . . *without requiring cases to be turned.*

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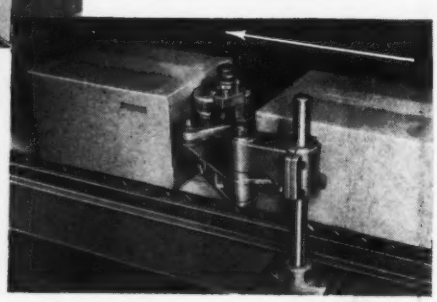
imprints *rear* and other *side* panel simultaneously



*Write for new descriptive sheet ROL-1*

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## Plant Safety Drive

—*Continued from page 71*

No matter where an accident occurs to any of your workers, the resultant time lost is costly and unnecessary. Off-the-job accidents just as well as those at the plant diminish when your workers are made thoroughly accident conscious.

A well-rounded safety program, actively pursued, pays many more dividends than just the savings on accident insurance premiums. For it is an understandable corollary that improvements in plant safety are accompanied by improvements in operations. And, vice-versa, better operating methods become an aid in promoting safety.

### Cost Is "Greatest to Smallest"

On the average, the cost of accidents falls heaviest on the small operator. There are several reasons:

*1. A crippling accident in a plant with 100 workers means, proportionately, far more man-days lost per total days worked than the same accident in a plant with 2,000 workers.*

*2. Too often small operators neglect safety training. Either they are not aware of the value of the training programs, or they consider the cost too great.*

Actually, a well-integrated, relentlessly pursued safety program is an economy regardless of the size of the plant.

And according to NSC, little companies have higher injury rates than big companies. All known studies show injury rates 2-5 times higher in small concerns than in large ones, even though the former have no more or no greater operational dangers or inherent accident hazards than the latter.

A recent study, which summarizes the 1952 accident experience of 1,964 Minnesota firms in 53 industries, confirms the point. Not only were accidents proportionately more frequent in the small plants than in large ones, but also they tended to be more severe.

Generally, injury rates are highest in plants with less than 50 employees. Next most hazardous are those with a 100-500 complement. In contrast, plants of over 500 employees are most safe.

There is an exception, however: In the food industry, the safety records of small-plant members of multi-plant companies are above average for their size. Safety is becoming a responsibility of corporate headquarters as well as of the local plant.

The safety program at one of the smaller divisional units in General

# Sanitation's A Cinch with *Carpenter* Stainless Tubing for Parts or Process Lines

For example: The filler tubes for ½ gallon milk bottles must be of such a quality that the manufacturer can polish both I.D. and O.D. to the equivalent of a sanitary finish. That's why he specifies Carpenter Stainless Tubing.

## Carpenter Stainless Is First Choice For:

***Finish*** There are never any pits, checks or scratches when you buy polished Carpenter Stainless Tubing.

***Strength*** Tight adherence to specifications for physicals is a Carpenter specialty.

***Light Weight*** Because the analysis is exact—the wall within specifications—the dimensions, too. Carpenter weights are on-the-button.

***Ductility*** Carpenter Stainless is easy to fabricate because tempers are "as specified".

***Uniformity*** Carpenter customers depend on the uniformity of Carpenter quality—length-to-length, order-to-order.

***Availability*** There is a Carpenter Distributor with adequate warehouse stocks as close as your telephone. He is ready, willing and able to give you any engineering or design help you need. When you call Carpenter, "One Call Does It All".

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Foods Corp. differs little in procedure from that at Maxwell House. And it differs not at all in the determination and drive to put the program across.

Here, the tasks of safety director are assigned to someone in the line organization. It is an added part-time responsibility, but one that pays off in good results.

In this case, the man named to direct is not separate from the line management and authority. He is a part of it. Nevertheless, the same general procedure applies in his administration of the safety program.

He serves in the capacity of helper and advisor. Responsibility for the program's success rests with foremen and supervisors.

Both in the large plant and the small one, the safety-program accomplishments pay for themselves many times over—in terms of employee morale, reduction of production losses, and cutting of insurance-premium costs.

*End (Resume reading on page 72)*

## Hi-Vac Ups Output

—*Continued from page 61*

deg. F. cooling water to pull temperatures down to 100 F. without cutting in the booster. However, the booster generally is cut in at 125 F. in order to improve the heat transfer economy ($\Delta T$).

At 125 F. the $\Delta T$ changes from 20 F. to 80 F. Optimum $\Delta T$ of the system for maximum cooling within a minimum time period is 35 F. The booster therefore takes over to maintain the optimum heat temperature gradient during the cooling cycle.

### Height Eliminated

The steam jets are designed with a low level barometric system that substitutes a pump discharge head for the barometric tail pipe seal. This eliminates the 40 ft. height requirements of a conventional barometric leg. It also permits installation of a vacuum utility in light industrial areas where zoning ordinances may prevent use of a full barometric leg. This is the case at Clark's, where zoning would forbid any equipment 40 ft. high.

The jets are supplied with steam from a 100-hp. completely automatic packaged boiler installation. Condensing water is furnished by a cooling tower designed to operate with or without forced-draft ventilation, according to requirements of operating load and atmospheric conditions.

*End (Resume reading on page 62)*

FRICK

**Equipment Freezes 18,000 Chickens Per Day**

Above: View of the packaging end of the Ocoma production line.
Below: Three of the Frick refrigerating compressors at Ocoma Foods.

At the Poultry Processing Plant of the Ocoma Foods Company in Berryville, Arkansas. This recent addition to the rapidly expanding Ocoma Foods Company employs over 275 people, and incorporates all of the latest developments in production-line poultry processing.

Six Frick compressors supply the refrigeration necessary for the chilling, quick-freezing and cold storage phases of the process.

This is but one of hundreds of different applications of Frick refrigeration and air conditioning in the food industries.

When writing for literature, please describe the cooling work you have in mind.

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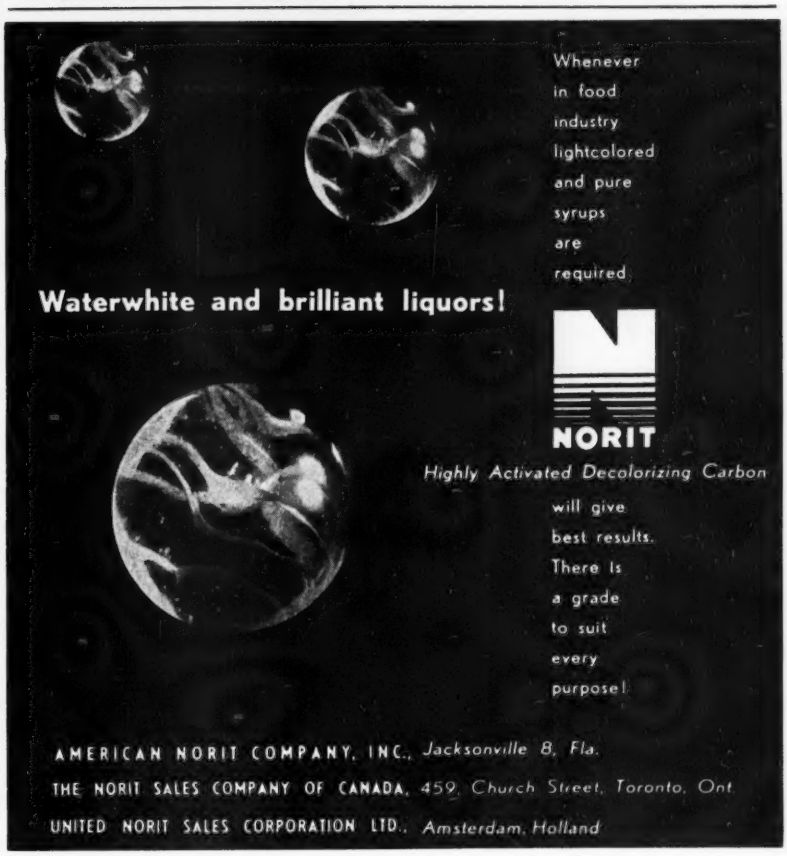
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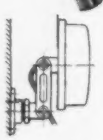

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# Useful New Books & Government Publications

## The New Profession

ELEMENTS OF FOOD ENGINEERING, VOL. II. *By Milton E. Parker, E. S. Harvey, E. S. Stateler. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 36. 1954. 6¼ x 9¼ in., cloth. Price:* $8.50.

The second in a three volume series directed at establishing the importance of food engineering as a new profession, and distinguishing it from chemical engineering and food technology, the book is of value to all concerned with the food industry.

Vol. I dealt with the engineering aspects of food processing, the agricultural and nutritional facets, food classification, and refined foods processing.

Vol. II is divided into three segments: assembly, preparation, and conversion of raw materials. Materials handling, cleaning, separating, pumping, mixing, heating, and refrigerating are among the subjects treated in separate chapters. Fully illustrated with photographs, charts and diagrams, the book is indexed.

## Meat-Tech Progress

MICROBIOLOGY OF MEATS. Third Edition. *By L. B. Jensen. Published by Garrard Press, 119-123 W. Park Ave., Champaign, Ill. 1054. 422 pages. 9¼ x 6¼ in., cloth. Price:* $6.00.

Completely revised and with six new chapters added, this book is the third version of an original published in 1942. The changes have been necessitated by the rapid advances in meat technology progress since the first and second printings. Among the news chapters are those concerned with curing of meats, microbiological objects of ice, freezing or meats and freezer storage, and organoleptic entities of microbiological origin.

Pertinent and extensive bibliographies are included in the volume. It is illustrated and indexed.

## New Enzymology Work

ADVANCES IN ENZYMOLOGY VOL. XV. *Edited by F. F. Nord. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1. 1954. 547 PAGES. 6¼x9¼ in., cloth. Price:* $11.00.

This fifteenth volume in a series on advances in enzymology and related subjects of biochemistry includes the work of six international authorities.

From Australia, S. J. Leach discusses the mechanism of enzymic oxidoreduction. Rene Wurmser of Paris, France, has written a chapter on *thermodynamique des reactions immunologiques.* Chemistry, metabolism, and scope of action in the pyridine nucleotide coenzymes are covered by Thomas P. Singer and Edna B. Kwarney of Madison, Wis. Alternate pathways of glucose and fructose metabolism is the topic of Efraim Racker, New Haven, Conn., while enzymic mechanisms in the citric acid cycle is covered by Severo Ochoa, New York. The final section in the book is written by H. Lindley of Melbourne, Australia, and concerns the mechanism of action of hydrolytic enzymes.

Each section is followed by a list of references. Illustrated, the book is indexed according to subject and author.

## Special-Product Plants

MODERN CHEMICAL PROCESSES. *Vol. III. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 36. 1954. 276 pages. 8 x 11¼ in., cloth. Price:* $5.00.

Third in a series describing chemical manufacturing plants, this book covers seven types of plants of interest to food processors. These include those manufacturing certified food colors, chemicals from milk, lactic acid from corn sugar, cellophane, carbonxymethylcellulose, diatomaceous earth, and chemicals from oranges.

Twenty-three recently developed chemical processes are described in all, with emphasis on background, description of plant installation, process and operation of plants, economics of process, personnel, and future aspects. The chapters are illustrated with flowcharts, and diagrams. Book is indexed.

## Pamphlets and Booklets

INCREASED PROFITABILITY THROUGH BETTER PACKAGING. *Published by American Management Assn., 330 W. 42nd St., New York 36. 1954. Paper. Number 44 in the Packaging Series, booklet includes a section on future developments and opportunities. Price is* $1.00 *for members,* $1.25 *for nonmembers.*

MATERIAL HANDLING. *Published by the Material Handling Institute, Inc., 813 Clark Bldg., Pittsburgh 22. 1954. Paper No. 4 Booklet in the "Library of Know-How" series. Booklet discusses organizational principles and rules applicable to material handling functions Price is* $.50.

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# KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

## Re Package Net Weights

The recently proposed *Simplified Practice Recommendation for Retail Container Sizes (New Weight) for Frozen Fruits & Vegetables* now has been approved by industry and becomes effective Aug. 2.

This development has been based on industry methods as surveyed by the National Assn. of Frozen Food Packers.

The approach was limited to net weight of a selected list of 19 fruits and vegetables, and it has no reference to shape, dimension, or materials of containers. Mimeo copies are available from Commodity Standards Div., Office of Tech. Services, U. S. Dept. of Commerce, Washington 25, D. C.

## For Better Butter

Following several years of work, a 6-man committee of the American Dairy Assn., announces a 4-point program to improve butter:

1. Aim for highest possible grade in manufactured butter. 2. Refine tests for quality of milk, cream, and butter, and use these tests more extensively. 3. Sponsor long-time research involving manufacture, storage, and merchandising. 4. Standardize color of butter by general trade areas.

## "Antibioticked" Beer?

Penicillin and streptomycin may help make better beer, according to U. of Southern California researchers.

Dr. Milo Appleman, chairman of the bacteriology department, and a grad student with brewery experience have treated brewers' yeast with antibiotics to kill long-common spoilage bacteria without impairing yeast growth. A combination of penicillin and dihydro streptomycin has proved most effective.

## Chem-Sweetening Issue

Any commodities sweetened with artificial materials are termed "dietary foods" in a resolution recently passed by the Assn. of Food & Drug Control Officials of the U. S.

Further called for is careful restriction of labeling and isolated marketing of such foods, intended as protection of the general public, while assisting those with special diets.

# One-Day Package Forum Proves Hit; Idea Encouraged; Highlights Briefed

Excellent values of a new idea—the local packaging conference—were demonstrated recently in St. Louis when the Packaging Institute staged a fast-moving one-day "forum in miniature."

It drew an enthusiastic group of nearly 200, thus closely resembled a major annual gathering. And its success has led the Institute to invite other regions to consider similar "quickie" conferences.

Here are highlights of the St. Louis meeting:

**The Mullen Test,** much used to gage ability of a package to perform its functions, was declared by Dr. L. E. Simerl, chairman, Materials Div. of the Institute, to have little real merit. Some of those present were "taken aback" by this statement, but Dr. Simerl "stuck to his guns."

**Downtime** of as much as 20% can be caused by a mere 0.7% of defective packaging materials, said C. F. Shockmiller, production manager, The Grove Laboratories. And he cited actual figures.

**Packaging-Cost Factors** were accented by F. A. Hunter, president, Hunter Packing Co. He said that evaluation of number of pounds of product that can be packaged per labor-hour is a pertinent approach that is very dependent upon type of package and equipment available for its automatic handling.

One detail on production concerned a tray-pack of wieners, machine-wrapped but hand filled and weighed. Here, productivity rate was 190 lb. per labor-hour, giving a labor cost slightly less than $0.01 per lb. The knockdown tray costs a little over $15 a thousand.

The cartons move to the wrapping machine—a method that gives a productivity rate of 295 lb. per labor-hour, running less than 0.005 per lb. Tray cost here is $9 a thousand.

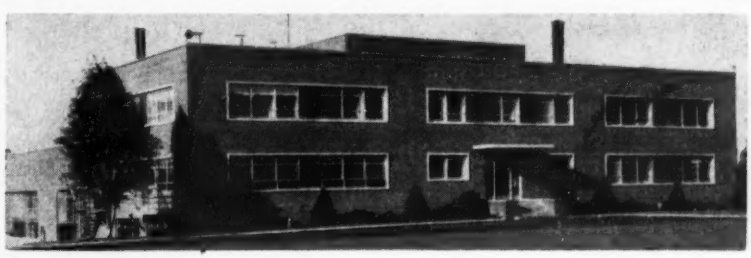
**The "Book Pack"** for bacon (waxed glassine laminated to waxed sulphite board) was cited by Mr. Hunter as keeping the product fresh for three weeks longer than other packages tested. But lack of product visibility was noted as a disadvantage.

This led to development of the "peek-a-boo" package, a modification of the "book" featuring a polystyrene-film window. And this has currently solved the problem.

**Buying "Specs"** were spotlighted by D. M. Baker, purchasing agent, Day-Brite Lighting, Inc. He ran through the following 15 points in the specifying of a carton after approval of sample:

1. Type of carton. 2. Quality of board. 3. Size. 4. Markings. 5. Designs and "opening" instructions. 6. Number of articles per carton. 7. Type and size of pads, fillers. 8. Simplicity of packing, filling. 9. Adaptability to machinery for packaging. 10. Protection against transit hazards. 11. Marking or shipping label areas. 12. Capacity and contents. 13. Usage application one time or warehousing for reshipment. 14. Taping or stitching. 15. Packing or use instruction code.

**Fringe Benefits.** Further on costs, Mr.



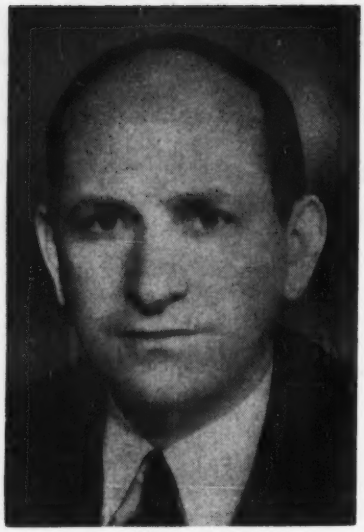
**Standard Brands' New Lab**

This $3½-million laboratory, consolidating under one roof research facilities of Standard Brands Inc., was recently opened in Stamford, Conn. Taking the place of a number of different buildings formerly utilized in New York City and elsewhere, the new facility employs 150 persons, of which nearly 100 are professionally trained scientists. It is organized into eight subdivisions. One feature is a complete modern bakery, and there is a pilot plant for studying products, such as soluble coffee.

Dr. L. E. Clifcorn

### Clifcorn to Head IFT

President-elect of the Institute of Food Technologists for '55-'56 is Dr. L. E. Clifcorn, director, Fundamental Research Div., Continental Can Co. He long has been active in studies of foods, nutrition, and food preservation, also has served numerous professional groups in the nutrition, research, canning, and chemical fields. And most recently he was chairman of the panel on foods, research and development of the Department of Defense. Dr. Philip K. Bates, Carnation Co., is '54-'55 IFT head.



Dr. Charles N. Frey

### Appert Award to Frey

To Dr. Charles N. Frey has gone the 1954 Nicholas Appert Medal, tokening preeminence in food technology. Cited were his contributions in the achievement of stable dried yeast, vitamin advances, and improvements in the production of bread, malt syrups, soluble coffee, margarine, dough conditioners, and egg products. Retired director of research of Fleischmann Laboratories, Standard Brands, he presently is lecturer at M.I.T. Award was at the recent IFT annual convention in Los Angeles.

Hunter cited the rise of fringe benefits, employee welfare, paid vacations, and the like, saying his own firm lays out more than $670 a year per worker for non-productive activity.

**Sales Value** of corrugated fiber shipping containers was emphasized by B. B. Holmes, v.-p., Ball Brothers Co. More than just protection, he said, these containers also offer a profit avenue through fostering sales. He added that helpful features come to mind in this approach—hand holes for handier carrying, easy-open gadgets, colored board, new-style printing, fluorescent inks, etc.

## Spices as Antioxidants

Two natural spices—sage and oregano—have been found to contain substances with greater preservative properties than some of the most powerful food antioxidants.

In micro-stability tests at Hormel Institute, sage yielded an antioxidant with an index of 28 at 0.02% concentration. And a substance derived from oregano had an index of 16. These figures are well over the rating of 10 for BHA, one of the most potent antioxidants used in foods.

## AMA Spotlights Relations, Maintenance, Handling

Employee relations, also preventive maintenance, and mechanized handling were leading subjects at the recent American Management Assn. conference in Cleveland.

Speakers were Paul D. Arnold, president, Arnold Bakeries Inc., Port Chester, N. Y.; George J. Martin, manager, mechanical division National Biscuit Co., New York City; and R. A. Peterson, manager, transportation and warehousing division, H. J. Heinz Co., Pittsburgh.

**"Good employee relations"**, stated Mr. Arnold, "pay off in increased productivity, lower turnover, quality based on pride, and progress through employee creative thinking. He further urged industry to provide highest security for its workers possible within the framework of free enterprise—because "unless we do it, government will."

**Preventive maintenance**, as described by Mr. Martin, is "a sound, tested system" for programmed inspection, adjustment, and repair of equipment before failures occur. He cited these eight major advantages: Reduction in emergency breakdowns during scheduled production periods; reduction in cost of maintenance, labor, and overtime; reduction in cost of maintenance parts and supplies; establishment of realistic equipment-replacement schedules; reduction of maintenance job costs; better work control through planning and scheduling; more economical use of maintenance personnel; and complete knowledge of job costs and also routine maintenance expenditures.

**Mechanized handling** of pallet load units has completely replaced manual materials handling at H. J. Heinz Co.'s new Pittburgh warehouse stated Mr. Peterson. New handling system involves making up "trains" of cases to go via 13 accumulator conveyors and 5 truck conveyors through 4 pallet loading machines and over subsequent conveyors and vertical lifts to one of three floors.

Under this system 48,000 cases can be taken from production lines during an 8 hr. shift, delivered on pallets to conveyor terminals at twelve points on the three floors, and moved by fork truck to tiered storage or shipping docks. Only two men's constant attention is required, with two electricians and two mechanics for maintenance.

## World Food Shorts

**Herring fillets** frozen in alginate jelly have shown excellent shelf-life over many months at Industrilaboratoriet A/S, Kristiansund, Norway. It's reported that tasters thought year-old product tasted better than fresh.

**Food equipment** in flour mill, vegetable oil, dairy, and refrigeration lines will be sought in major quantity by Argentina, and a good portion of orders should go to U. S. A mission of Assn. of Argentine Cooperatives is now abroad making contacts in world market.

**Candied fruit** without loss of vitamins and enzymes, as common with conventional heating, is announced at Milan University, Italy. In process, fruit prepared as for candying by heat is next held at room temperature two or three days longer to absorb sugar, then is frozen (21 deg. F.). Product is said to keep indefinitely at 15 F.

**A milk can** invented in Denmark is said to keep the product fresh for weeks without cooling. Called Hydrodan, the can is cleaned at dairy, filled with $CO_2$, and covered with special filter paper, then delivered to farm. Farmer takes off tight-fit lid and milks directly into can. When filled, he removes filter paper and seals lid. Successful tests were conducted by Danish State Dairy, Copenhagen.—*McGraw-Hill World News.*

## Food-Poisoning "Staph" Checked by Serine

Researchers at American Institute of Baking, Chicago, reported that additions of 0.2-0.3% serine to cream-custard type baked foods (vanilla filling, in this case) will inhibit growth of food-poisoning staphylococci and those bacteria responsible for "normal" spoilage.

Serine is an amino acid—a food component offering no apparent hazard in cream fillings. A white crystalline powder, it imparts no odor or taste.

Though not now commercially available, it is hoped that serine later may be obtained, under license from A.I.B., to aid food men in curbing "staph".

Results indicate that serine gains effectiveness where milk has been omitted from the formula. And it is even more efficacious where the egg has been left out, for increased amounts of egg yolks lessen its power. However, egg white seems to aid it. Shortening appears to have no influence. But coconut completely blanks out the inhibitory effect.

# Hors d'Oeuvres

**▶ Per capita consumption of canned prune juice has increased 1,200% since 1939. Would it be because people like it? Or because they need it?**

▶ Swanson reports phenomenal acceptance of its frozen heat-and-eat-turkey dinner. After 5 months, sales exceeded by 419% the demand in a similar period for the firm's popular chicken pies. Credit is given to those Washington hearings, which kept the homemaker in front of her TV instead of her stove. Seems like a big price to pay for success.

**▶ Port Pirie, South Australia, proposes the packaging of milk in plastic containers that can be tossed at the house like the morning paper. Who wants to climb to the roof before breakfast?**

▶ A steer recently escaped from a Manhattan slaughter house, ran up the streets and railroad tracks for 109 blocks, then swam a mile across the Hudson River. He was caught in New Jersey and hauled through the Lincoln Tunnel back to the meat plant. We hope someone wished him bon voyage.

**▶ One-fourth of the milk consumed in Chicago is sold in gallon jugs. People are learning to buy health in the large economy size.**

▶ Government scientists are producing radioactive fertilizer. It's for experimental agriculture, so don't rush out and buy a Geiger counter to inspect your raw materials.


**Nicholson Steam Traps Cut Heat-Up Time 48%**

A large processor recently reduced the heating cycles of cookers from 105 min. to 50-60 min., by substituting Nicholson thermostatic steam traps for a mechanical type. This effected a gratifying production increase of 37%. Reasons for Nicholson's faster heat transfer: operate on low temperature differential; 2 to 6 times average drainage capacity; maximum air venting. Send for....

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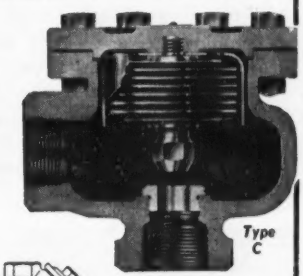


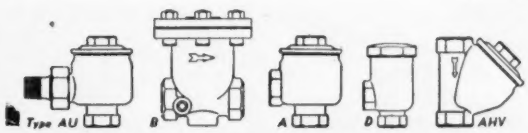


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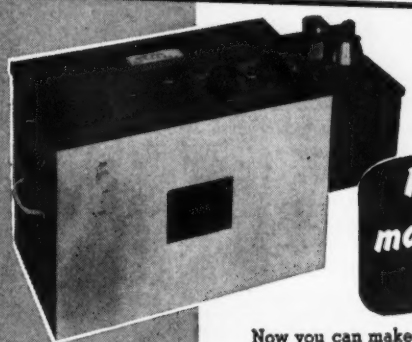

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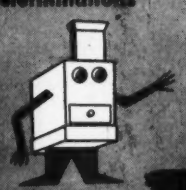

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# How dough mixer saves dough
## *with TIMKEN® bearings on agitator shaft*

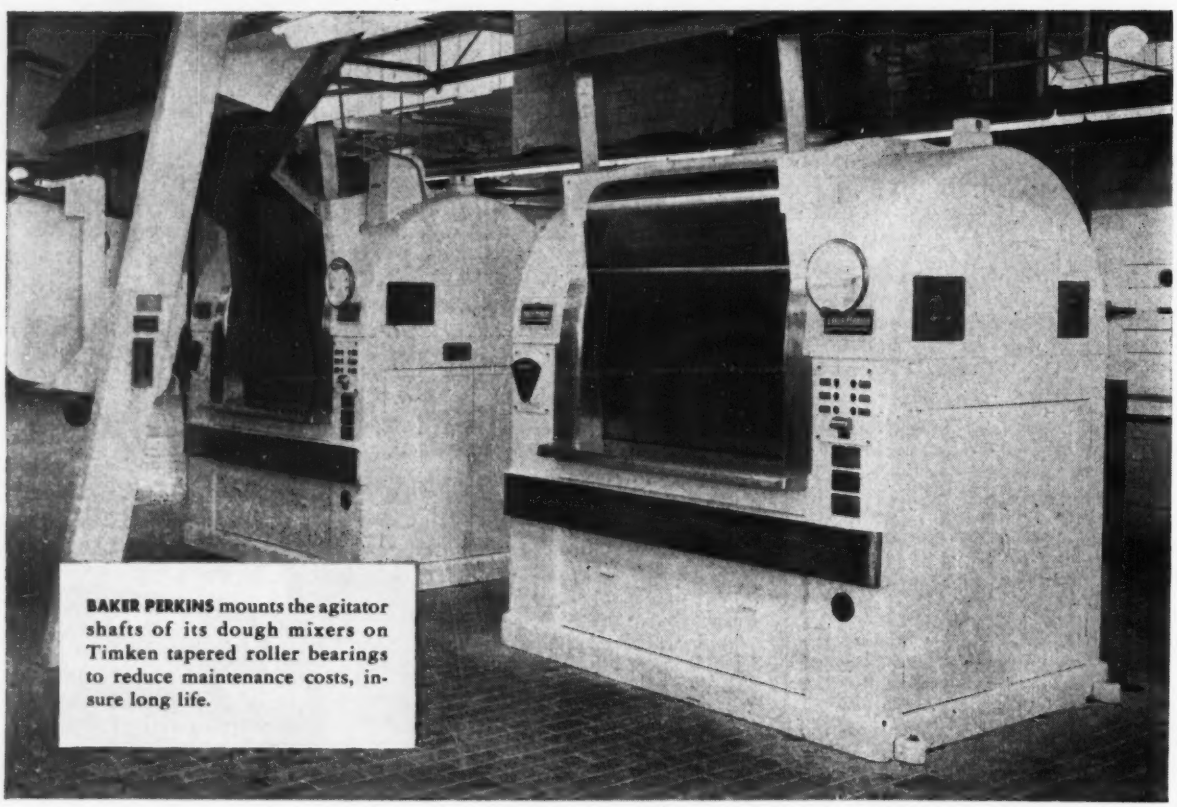
BAKER PERKINS mixers not only produce exceptionally smooth and lively sponge but save money by reducing maintenance costs. One important reason: Timken® tapered roller bearings are used on the agitator shafts.

Timken bearings easily take the heavy load of the full bowl (up to 1600 lbs. of dough in largest model). Full line contact between rollers and races of Timken bearings gives them load-carrying capacity to spare. The true rolling motion and smooth surface finish of Timken bearings practically eliminate friction, further reducing maintenance and wear.

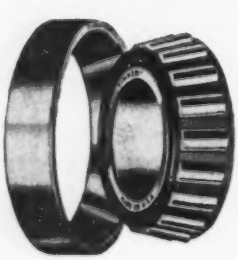
With Timken bearings, there's no chance of leaks contaminating the dough as it's mixed. Timken bearings are made with extreme precision. They hold housings and shafts concentric, making closures more effective. Lubricant is sealed in, dirt is sealed out. Maintenance is minimized.

Make sure you specify Timken bearings in the machines you build or buy. They give longer life with less friction. To make sure Timken bearings are made of the finest steel available, we make our own. We're the only U. S. bearing manufacturer that does. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*



**BAKER PERKINS** mounts the agitator shafts of its dough mixers on Timken tapered roller bearings to reduce maintenance costs, insure long life.



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## Keep Meats Chilled!

Re-emphasizing the dangers of storing or displaying film-wrapped meat products without refrigeration, USDA now has called for labels on such packages to bear prominent "Keep Refrigerated" warnings (effective Sept. 1).

It is pointed out that risk of development of food-poisoning organisms remains, despite recent advances in stabilizing products. Of late, problems traced to laxities have risen.

## Unit "Smells by Color," Gages Odor, Spoilage

Precise checks on degree of food odor and spoilage by mechanico-chemical means now may become commercially feasible.

Opening the door to this possibility is a development by Dr. Lionel Farber, associate research biochemist at U. of California's Hooper Foundation, San Francisco Medical Center. He has contrived equipment wherein clean air is passed through the juice sample of a food and then the resulting volatile-entrained air goes to a second container to be subjected to alkaline permanganate.

Thereupon, color changes take place relative to the quantity of volatiles, ranging from the initial magenta, through blue, gray-blue, and green-blue, to green and pale green.

The latter hue is found only in cases of extreme spoilage.

Dr. Farber believes the technique can be developed for fine grading of such foods as fish, vegetables, cheese, coffee, and spices.

## Soluble From Salvador

Production of soluble coffee right at the bean source in El Salvador now is being charted by leading growers of the Central American republic. Teamed with Tenco Co., Linden, N. J., these interests would export the powder-form product to the U. S. Lower labor costs are cited as an advantage.—*McGraw-Hill World News.*

# New Coatings vs. Costly Cocoa Bean

Candymakers rolled up their sleeves and targeted the sharp rise in cocoa bean prices—from 40 to 64¢ between Nov. 1953 and May 1954—at the recent annual convention of the National Confectioners' Assn. in Chicago.

**Outlook:** According to the U. S. Dept. of Commerce, adjustment in demand, over the short run, will tend to restrain further price advances. Use in coatings of extenders or hard fat substitutes for cocoa butter is already being carried out by big companies.

Sharing of this know-how proceeds, and so cocoa bean producers stand to lose some of their markets. Present pressure of prices may create other economies in use of chocolate.

Long range prospect for increase in supplies—particularly from South and Central American growing areas—appears hopeful.

**Developments:** Available are more efficient methods for making confectionery coatings, reported Justin J. Alikonis, Paul F. Beich Co. Chocolate flavor of cocoa powder will be accented in these coatings.

It is also possible, he said, to add Brewer's debitterized yeast products to enhance coating flavor and increase nutritional value.

On the way are better hard butters that have a snap similar to cocoa butter at room temperature. These now exceed the palatability of cocoa butter. Too, they withstand higher temperatures, and they also have the same plastic range (not too soft in summer, nor too hard in winter) so noticeable in improved margarines.

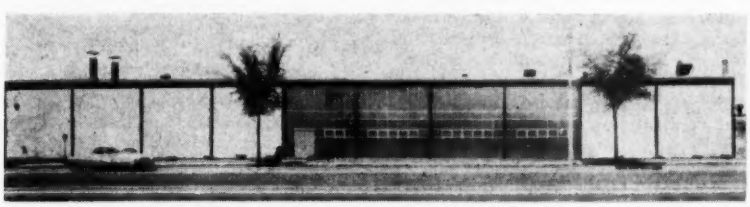
He forecast that the cocoa bean in the future will only be used for its flavoring characteristics. Before long, very little cocoa butter will be pressed. The manufacturer may judiciously incorporate chocolate liquor, with certain permissible emulsifiers, as is done with improved vegetable hard butters.

He went on to predict that if cocoa bean prices continue high, domestically toasted cereal grains, flavored with synthetic chocolate flavor, will take their place at the same level that synthetic vanilla flavors have replaced vanilla beans.

With advent of better confectionery coatings, he thinks 5c. bars will stay.

**Suggested Use:** To help manufacturers, the NCA Research & Development Committee on Confectionery Coatings outlined 12 basic steps:

1. Purchase coatings from manufacturers, unless you have adequate chocolate manufacturing equipment, proper technical staff, and are making your own chocolate coating.
2. Secure instructions from supplier, avoiding mixing product from one supplier with that from another without evaluating finished coating for bloom over a 4-week period.
3. Thoroughly test finished products.
4. Use low cocoa-butter content in coating—a cocoa powder with less than 15% cocoa butter. Supplier should not use free cocoa butter or chocolate liquor in coating.
5. Thoroughly clean equipment in changing coatings.
6. Melt coatings (in 98-103 F. melting point range) at temperature not to exceed 120 F. Then cool, with agitation, in tempering kettle to mush consistency, avoiding jacket water colder than 75F. Raise temperature to proper consistency for enrober use (maximum of 103 F.). But hold in tempering kettle for as long as feasible, since coating takes longer to "seed" or form fat crystals.
7. Enrobe with temperature of centers 5-10 deg. F. higher than for conventional chocolate coating.
8. Employ slightly higher cooling-tunnel temperatures. If possible, increase time in tunnel.
9. Store finished goods at least 48 hr. before shipping. Temperature of storage room: 60-70 F.
10. Select porous wrapping materials to release moisture and latent heat, particularly with high-moisture centers subject to "sweating."
11. Store coating under same conditions as chocolate coatings.
12. Use caution in coating high-moisture centers.



**Multiplies Soft-Drink Output**

Today's expansible, functional factory is notably exemplified in this new Milwaukee Pepsi-Cola plant that triples capacity of old facility. Encompassing 44,000 sq. ft., it has stainless steel facing, sand-colored brick, and heat-absorbing glare-reducing blue glass. Air-filtered pressurized syrup and filling rooms are featured.

## Candy Technologists Elect

New officers of the American Assn. of Candy Technologists, named at the recent convention in Chicago, are: President, Norman Kempf, Walter Baker & Co.; 1st v.-p., Vincent Ciccone, Charms Co.; 2nd v.-p. Otto Windt, E. J. Brach & Sons; sec.-treas., E. W. Meeker, American Sugar Refining Co.; and asst. sec., H. F. Dresel, Felton Chemical Co.

**Spurring Milk Consumption**

To help the general dairy situation, USDA has installed automatic milk dispensers in its Washington headquarters. Seen enjoying a "milk break" are (l. to r.): Don S. Anderson, director, livestock and dairy div.; Sen. Edw. J. Thye (Minn.); E. L. Lommasson, cafeteria manager; Secretary of Agriculture Ezra Benson; and Rob't. D. McMillen, asst to the sec'y.

## Your Future Prospects For Vital Plant-Water

Current and future status of the industrial water supply and pertinent equipment were discussed in a special forum at the recent opening of the new pump works of Fairbanks, Morse & Co., Kansas City, Kan.

By 1975, water supply may be the most important factor affecting industrial location, according to G. A. Hathaway, Special Ass't. to Chief of Engineers, Dept. of the Army. He predicted a doubling of demand—up to 340 billion gal. per day. Future needs must be solved by recirculation, reclamation, and better use of existing supplies.

He also said the West may be forced to reallocate water rights, and that the East must draw a line against stream pollution.

Meanwhile, demand is for bigger, more efficient pumps, noted C. P. Linder, Chief Engineer, South Atlantic Div., Corps of Engineers, Dept. of the Army. He cited use of 116-in. propeller pumps, driven by diesel to pump flood waters from Florida swamps into reservoirs, against future demand.

Discussing wells, D. R. Rankin, Peerless Pump Div., Food Machinery & Chemical Corp., stated drillers have had to go deeper and deeper to reach water. Within the next few years, motor makers will offer submersible units for deep-well pumping.

Hydraulicians face three water problems, according to Lew Kessler, Chief Engineer, Fairbanks-Morse: (1) Conservation in irrigating crops, (2) getting large quantities to new industrial sites (perhaps with nuclear-power aid), and (3) taking good water to where it will do most good for consumers.

Re the latter, he noted possibilities of a pipe system to carry Lake Superior's excellent soft water along the Mississippi River bottom.

# Briefly . . .

• MEAT MEN have a new state group—the Ohio Assn. of Meat Packers. President is H. Huntington, of Newark, and E. Schmidt, Toledo, is v.-p.

**• FROZEN JUICE concentrate field has a second entry from among Hawaiian pineapple concerns—Libby McNeill & Libby, with a double-strength product. Hawaiian Pineapple Co. (Dole) was first, launching a quadruple-strength concentrate in '52.**

• FOOD, TOO, is in the forefront—as Watson Rogers, president of National Food Brokers Assn., pertinently notes in these words: "People are overawed by the major developments in science, the symbols of the new era. But many of us who are close to the food industry do not realize that our industry, too, has been making tremendous progress. In many ways our achievements have been as revolutionary as any, as valuable as any."

**• AWARD OF MERIT for contributions to executive skills has been presented to Paul Dean Arnold, president of Arnold Bakers, Inc., by Research Institute of America. His idea: Streamlining of handling of employee problems by assigning a special management representative to work constantly on the bakery production floor.**

• "AUTOMATION must be accorded careful attention by every manager in business and industry to avert the risk of being left behind in this fast-moving technical era," says W. A. Wildhack, chief instrument engineer, National Bureau of Standards, and president of the Instrument Society of America.

## Ray Sterilization of Meat Not Yet "Ironed Out"

Although gamma ray "pasteurization" of meat has "worked" on a lab scale, this doesn't mean the technique is ready for commercial use. In truth, there still remain major scientific, technological, and economic problems to resolve.

So states Dr. B. S. Schweigert, who is assistant director of research, American Meat Institute Foundation.

Foundation studies, supported by A.E.C., show shelf-life of pre-packaged meats may be extended five-fold by low-radiation doses, with little, if any, off-flavor, odors, or discolorations resulting.

But it's emphasized that acceptability of such products after storage and cooking hasn't been adequately demonstrated.

## USDA Standards

Recent standards actions by USDA's Agricultural Marketing Service, along with *Federal Register* citations, include the following:

*Dry whole milk*, proposed May 19 *F.R.*, p. 2703.

*Frozen french fried potatoes*, proposed, May 20 *F. R.*, p. 2944.

*Frozen green and wax beans*, effective July 4, June 4 *F.R.*, p. 3293.

*Dry whey*, effective July 8, June 8 *F.R.*, p. 3349.

*Oranges*, grown in Texas and states other than Florida, California, and Arizona, proposed revision, June 8 *F.R.*, p. 3356.

## Schedule of Events

**July**

13–15—Western Plant Maintenance Show; Pan Pacific Auditorium, Los Angeles.

**August**

17–19—Western Packaging & Materials Handling Exposition; Civic Auditorium, San Francisco.

29–S1—International Apple Assn.; Yakima, Wash.

**September**

12–15—Confectionery Caravan Show; Palmer House, Chicago.

15–21—Instrument Society of America, 1st International Exposition & Congress on automatic control in manufacturing; Commercial Museum, Philadelphia.

17–19—National Poultry, Butter & Egg Assn.; Chicago.

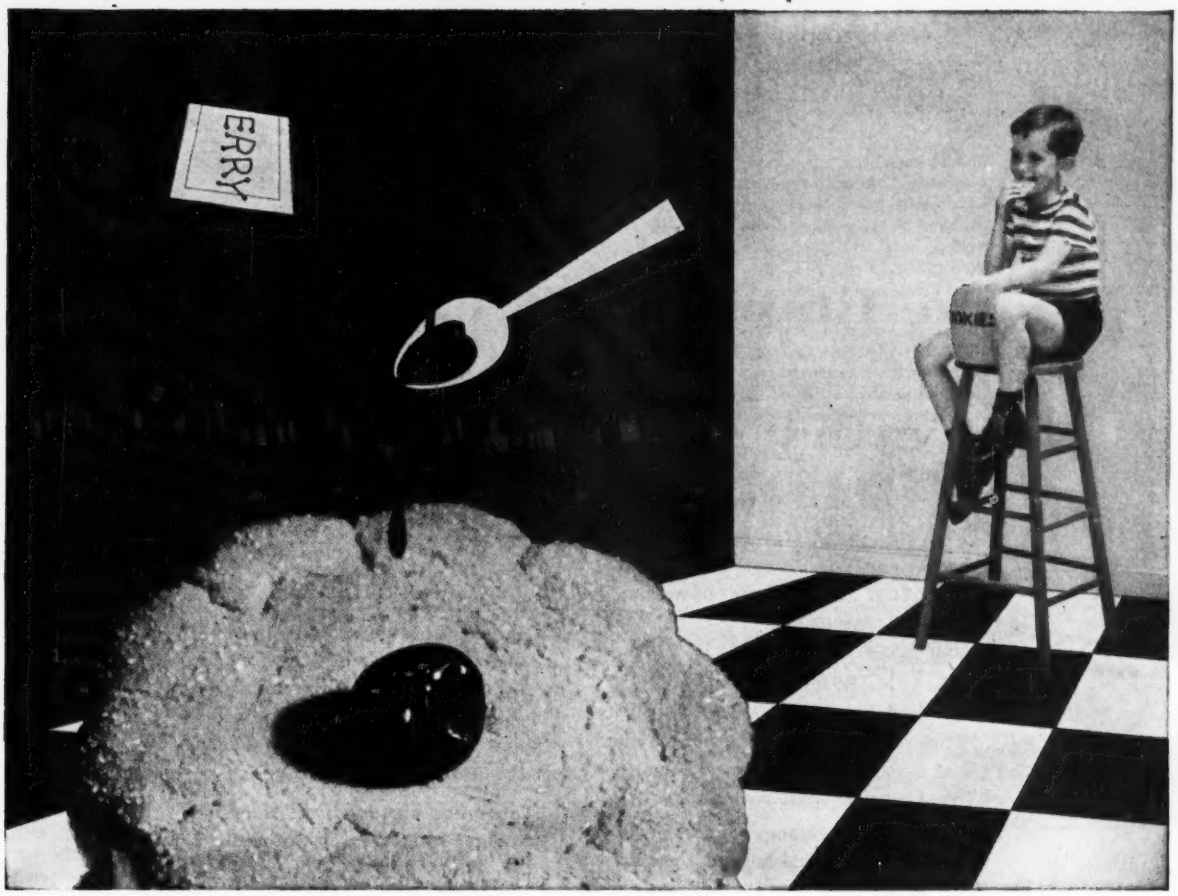
19–22—National Frozen Food Locker Institute; Hotel Jefferson, St. Louis.

26–28—Southern Bakers Assn. Production Conference; Hotel Biltmore, Atlanta, Ga.

26–30—Master Brewers Assn. of America, annual convention; Waldorf-Astoria Hotel, New York City.

28–30—National Industrial Packaging & Materials Handling Exposition (Coliseum); and annual convention of Society of Industrial Packaging & Materials Handling Engineers; Chicago.

30–O2—Southwestern Frozen Food Assn.; New Orleans, La.

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The very lives of your employees are at stake. Yours is a grave responsibility. Consider what may happen.

When the emergency comes, everybody's going to need help at the same time. It may be hours before outside aid reaches you. The best chance of survival for your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. To be unprepared is to gamble with human lives. Disaster may happen TOMORROW. Insist that these simple precautions are taken TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's entirely integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here again, your CD Director can help—with advice on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First Aid Training Courses.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good employee relations—and no greater way of helping America.

***Act now . . . check off these four simple points . . . before it's too late.***

## One-Man Loading

—*Continued from page 125*

This first step in city-route truck loading takes place when George arrives in the morning. Using his lift-truck, he makes up two assorted pallet-loads of the less popular case beer items for each route truck. These 14 pallet-loads are spotted conveniently so as to be loaded on the trucks later that day.

Second step: Upon returning to the warehouse, route-truck drivers don't unload their trucks. They simply check-in their day's business. George then spots the trucks and unloads them, making a check of the cases of empties and cases of unsold cans or bottles taken from each truck.

Third step: After stripping the trucks, George then re-loads them for the next day's business. Each truck is stocked with two pallets of assorted items, plus five solid pallets of the more popular packages.

Up to eight pallet loads can be stored in the truck body. Normally, however, one empty pallet is placed in the rear where the driver stacks empties.

Generally, kegs are not carried on the same truck with case goods. The distributor has two trucks with bodies specially designed for keg delivery. Pallets measure 32 in. by 40 in.—a standard size that holds 70 cases of cans, 42 cases of 24/12 oz. bottles, 35 cases of quarts, or 8 kegs (double-decked with a plywood sheet between the two layers of kegs).

*End* (*Resume reading on page 127*)

## Enzyme Tenderizer

—*Continued from page 94*

For example, the enzyme preparation involved not only works on starch, but could—under certain conditions and in certain proportions—also break down proteins to amino acids, and fats to free fatty acids. Extensive activity on these constituents would, of course, affect flavor and texture. Hence this very careful control of the enzyme balance and potency to "steer" the action and prevent foreign qualities.

Aside from the enzyme combination and its potency, conditions of application also influence results. Thus, the need for definite temperature and pH stability in the brine-carrying medium.

Actual use of the enzyme preparation in the cannery is a simple procedure: The material is added in the make-up vat at the rate of about ¼ teaspoon per gallon of brine. A typical brine for peas would contain 100 lb. of sugar and 40 lb. of salt to 200 gal. of water. Brine is heated by steam to 200 deg. F. prior to passage by pipe to the filler.

After filling, cans are sealed and held either on conveyor or in basket for roughly ½ hr. prior to loading into the retort. During that time the enzyme brine penetrates the pea skin by osmosis and acts on the cellular starch.

Enzyme action causes the highly polymerized starch—typical of more mature or "over-ripe" peas—to break down to low polymer forms that are less resistant to shearing and more indicative of tenderness. Also, a certain portion of this starch is converted to a mildly sweet reducing dextrin. And a still smaller portion of the latter resolves to maltose.

The above enzymic action takes place not only during the standing period before retorting but also in the "come-up" time in the retort before temperatures reach 200 deg. F.

Taste panels of Mammoth Springs employees have confirmed both the tenderness- and sweetness-enhancing aspects of the enzyme-treated product. And calculations based on actual operating proportions have indicated that the preparation can be added for a small fraction-of-a-cent per pound of peas processed.

*End* (*Resume reading on page 95*)


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# Recent Inventions

## PRODUCTS

Dairy Products Made by Roasting Comminuted Cereal With Butter, Boiling With Milk and Cream, Aerating Cooling, Draining, Evaporating—*A. D. Maissian, Philadelphia, No. 2,671,025. March 2, 1954.*

Sugar-Fat Bon Bon Coating Inhibited Against Dulling By Incorporation of Fatty Acid Derivative Mixture—*S. T. Cross, Elsmere, Del., to Atlas Powder Co., Wilmington, Del. No. 2,671,027. March 2, 1954..*

Egg White Composition Consisting of Dry White Plus Dry Whipping Agent Which Can Be Water Reconstituted—*T. P. Finucane, New Vernon, and W. A. Mitchell, Lincoln Park, N. J., to General Foods Corp., New York City. No. 2,671,730. March 9, 1954.*

Cultured Milk Powder Made by Condensing, Inoculating, Holding to Definite Lactic Acid Content, Dehydrating—*R. E. Birch and C. L. Thompson to Harbison-Walker Refractories Co., Pittsburgh, Pa. No. 2,671,732. March 9, 1954.*

Baking Pan Coating Compound Consisting of Organopolysilane-Polysiloxane—*H. A. Clark to Dow Chemical Corp., Midland, Mich. Nos. 2,672,102-5. March 16, 1954.*

Layer Steak Formed by Cutting Incisions Through Stack of Slices to Consolidate and Interknit Them—*G. A. Minder, Seattle, to Minder Bros., Inc., Spokane, Wash. No. 2,673,156. March 23, 1954.*

Low-Methoxyl Pectin Gel Comprising Pectin in Solid Solution in Sugar With Calcium Source—*A. D. Sheperd, El Cerrito and R. M. McCready and H. S. Owens, Berkeley, Calif., to USA. No. 2,673,157. March 23, 1954.*

Comminuted Meat Milk Substitute With Added Fat, Carbohydrate, Selected Minerals—*H. B. Lockhart to Swift & Co., Chicago. No. 2,673,803. March 30, 1954.*

Frozen Concentrated Chocolate Mix With Desirable Viscosity Characteristics Made by Heating, Concentrating, Introducing Additional Chocolate Flavor, Freezing—*G. C. North, R. A. Klein, and P. P. Noznick to Beatrice Foods Co., Chicago. No. 2,672,419. March 16, 1954.*

Clam Chowder Made by Cooking Base, Cooling, Ageing, Reheating, Adding Clams, Cooking—*G. H. Christiansen, Newark, N. J. No. 2,672,421. March 16, 1954.*

Sugar From Cane by Pressing, Defecating, and Evaporating With Addition of Sodium Hydrosulfite to Juice at Any Stage After Grinding and Before Discharge From Evaporators—*A. L. Sklar, Miramar, Havana, Cuba to Virginia Smelting Co., West Norfolk, Va. No. 2,672,428. March 16, 1954.*

## PROCESSES

Treating Fertile Eggs by Immersing 3-5 min. in Liquid Containing Nutrilites at 40 F., Incubating—*J. E. Sherman and L. B. Jensen to Swift & Co., Chicago. No. 2,676,105. April 20, 1954.*

Dehydrating Solid-Bearing Liquids by Freezing to Slush in Successive Steps, Screening, Returning Liquid to Cycle—*E. P. Wenzelberger to Commonwealth Engineering Co., Dayton, Ohio. No. 2,676,469. April 27, 1954.*

Smooth-Skinned Ring of Yeasted Dough Formed by Extruding Through Ring-Shaped Orifice While Subjecting to Prolonged Rubbing in two Directions, Shearing Extruded Ring—*H. T. Hunter, Baltimore, Md. and B. W. Wilson, Manhasset, N. Y. to Doughnut Corp. of America, New York City. No. 2,676,552. April 27, 1954.*

Cans Washed and Sterilized Below 150 F. Using Non-Corroding Alkaline Synthetic Detergent Solution With Water-Soluble Fat Solvent Followed by Quaternary Ammonium Compound Solution Containing Rust Inhibitor—*F. M. Scales, Achushnet, Mass. No. 2,677,630. May 4, 1954.*

Jellied Confectioneries of Gum Drop Type by Cooking Starch-Sugar Dispersion at 250-300 F. Under Super-Atmospheric Pressure, Cooling—*R. M. North, Northfield to Farley Mfg. Co., Skokie, Ill. No. 2,678,276. May 11, 1954.*

Preserving Peeled Fruit in Fresh Condition by Immersing in $SO_2$ liquor to Attain Content of 40-80 ppm., Firming in Air—*E. F. Glabe to Food Technology, Inc., Chicago. No. 2,678.277. May 10, 1954.*

## EQUIPMENT

Macaroni Extruder Equipped With Air Cooling Means to Dry and Harden Product Followed by Automatic Cutting—*J. Pellegrino,*


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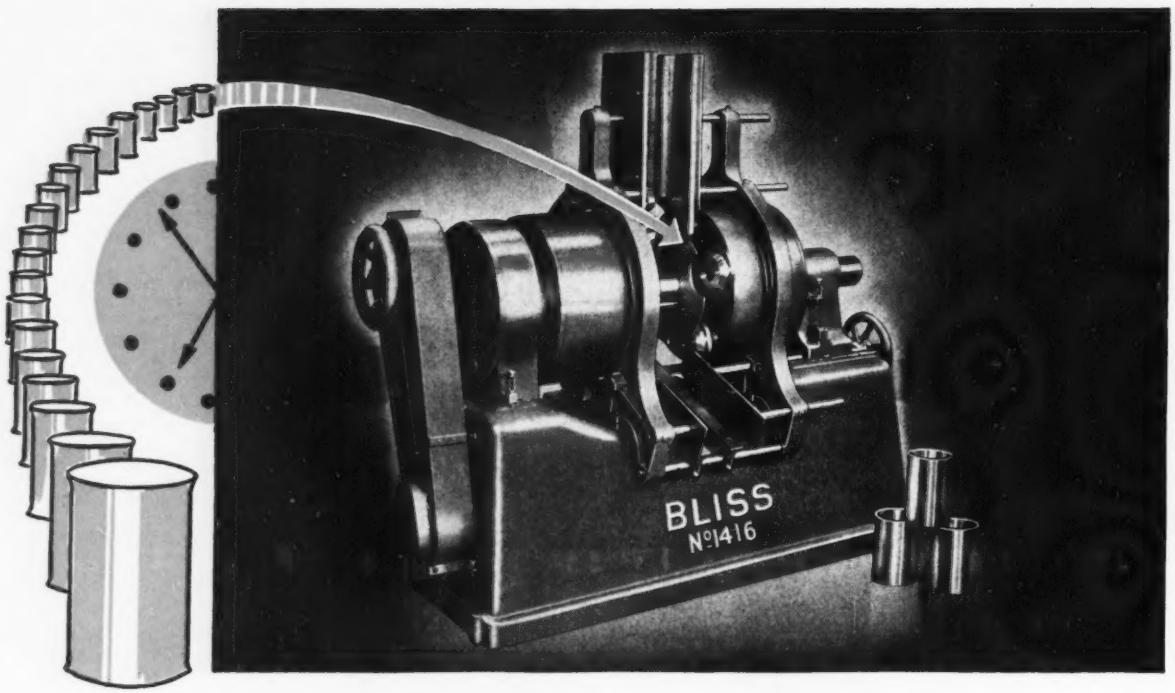


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Andover, Mass. to A. W. Deller. No. 2,669,195. Feb. 16, 1954.

Rotating Drum Nut Sheller With Progressive System of Beating Product in Passage by Radially-Spaced Rim Surfaces—L. J. Meyer, San Antonio, Tex. No. 2,669,268. Feb. 16, 1954.

Sausage Casing Stripper With Feed Rolls and Electromagnetic Guillotine With Pneumatic Strip Remover—E. C. Mosby, Chicago, 25% to D. M. Heller, Skokie, Ill. No. 2,670,498. March 2, 1954.

Sausage Casing Sealer Employing Cooperating Punch Block and Plunger to Affix Barrell Fasteners —J. J. Frank, Union, N. J. No. 2,670,524. March 2, 1954.

Chocolate Shell Fabricator Employing Suction Nozzle Manifold Over Mold Cavities—C. J. Covert, Glen Rock, and J. L. Raffetto, Jr., Ramsey, N. J. to Racine Confectioners' Machinery Co., Racine, Wis. No. 2,670,696. March 2, 1954.

Sugar Beets Screener With Elastoplast Agitating Members to Dislodge Dirt, Rocks, and Debris—G. W. Rienks and H. F. Silver, Denver, Colo. No. 2,670,846. March 2, 1954.

Fondant Maker With Refrigerated Jacket and Conveyor-Agitator—J. S. Truesdale, Los Angeles, Calif. No. 2,670,937. March 2, 1954.

Vertical Green Malt Producing Apparatus With Mechanically Discharging Subdivided Germinating Compartments—M. Ruzicka, Brno, Czechoslovakia. No. 2,671,045. March 2, 1954.

Continuous Chocolate Mold Scraper With Reciprocating Elements—I. J. Jacobsen to Mikrovaerk A/S, Soberg, Denmark. No. 2,671,517. March 9, 1954.

Fruit Seeder and Segmenting Unit Employing Rotating Spindle and Spaced Knives With Oscillating Action—H. L. Smith and W. C. Northam, Richmond, Va. to C. H. Musselman Co., Biglerville, Pa. No. 2,671,485. March 9, 1954.

Carcass Freezing System Employing Refrigerant-Fed Rod-Insert Member—R. A. E. Towse, Brooklyn, N. Y. No. 2,672,032. March 16, 1954.

Fish Aligning and Positioning Mechanism For Feeding Cutting Machine—O. J. Haber (deceased), by O. M. Haber, San Francisco. No. 2,672,647. March 23, 1954.

Peanut Sheller of Rotor Construction With Shelling Grate—L. Pearman and S. Pearman, Chula, Ga. No. 2,672,901. March 23, 1954.

Egg Washer Comprising Cleaning Tank and Dryer Tunnel Served by Endless Conveyor and Egg Rolling Means—E. E. McCutchan, to R. E. McCutchan, Long Beach and D. S. McCutchan, San Bernardino, Calif. No. 2,673,361. March 30, 1954.

Egg Preserving Apparatus With Heated Oil Streams Over Endless Side Chain Conveyor Belt—G. W. Johnson, Raytown to Gordon Johnson Co., Kansas City, Mo. No. 2,673,515. March 30, 1954.

Bread Dough Panner With Dough Ball Convevor and Means for Ejecting Into Positioned Pans —G. A. Jorgenson, York, Pa. to Read Standard Corp., New York City. No. 2,673,672. March 30, 1954.

Chocolate Concher Employing Centrifugally Fed Rotating Disk-Shaped Bodies—A. Hansen, Herlev, Denmark to Milrovaerk A/S, Soborg near Copenhagen, Denmark. No. 2,673,802. Mar. 30, '54.

Ice Cream Filling Machine With Vertical Reciprocating Nozzle—F. C. Gross, Chicago, and F. S. Chytil, Cicero, Ill. to Package Machinery Co., East Longmeadow, Mass. No. 2,672,262. March 16, 1954.

## PACKAGING

Grain Protected From Weevils by Inclusion of Fine-Ground Heat-Expanded Perlite—E. Klein, Tel Aviv, Israel. No. 2,673,158. March 23, 1954.

Closure For Screw Neck Bottle Consisting of Cork Insertion and Cap That Surrounds Without Contacting Pouring Lip—O. H. Rasch, Frederiksberg, near Copenhagen, Denmark. No. 2,674,388. April 6, 1954.

Hops Shipping Method In Which Rectangular Bale is Pressed to Circular Cross Section, Encased in Two Steel Drums, Sealing Flanges of Drums—S. S. Meisler, Hollis Hills, N. Y. No. 2,674,535. April 6, 1954.

Precooked Frozen Food Package Comprising Light Metal Tray With Peripheral Lip, Foil Covering Bent Around Lip—J. Fisher, Philadelphia. No. 2,674,536. April 6, 1954.

Olive Packer Comprising Receiving, Retaining Element, Means for Shifting Same Through Open Top of Container to Precisely Position Olive, Then Rotate Container to Receive Next Fruit—G. A. Weimer to Ernst & Ernst, Minneapolis. No. 2,675,153. April 13, 1954.

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For
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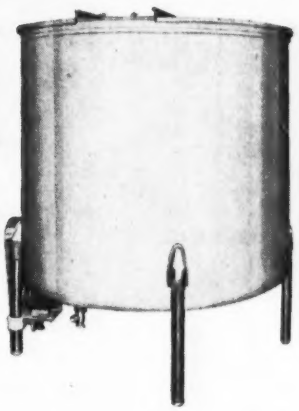

Whatever your need in stainless steel tanks, and stainless steel fabrications, P & R can meet them best—best materials . . . best workmanship . . . best price. Tanks of all sizes, types and shapes are available, jacketed, vertical, or horizontal, with or without agitators, valves, lids or motors. The smooth sparkling stainless steel surface of P & R tanks is easy to clean, sanitary and corrosion resistant. You get years of practical, efficient service at a cost that is surprisingly low.

- Rounded bottoms for sanitation
- Side mounted legs
- Flush type sanitary stainless steel drain valves.
- Inclined bottoms for complete drainage
- Splash proof

REPRESENTATIVE wanted to handle exclusive territories.

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Divo-kill
Wipe out Drosophila and Flies in fields, on trucks, at docks.
200 to 400 times more kill power than diluted water type insecticides. Completely safe to use. No odor. Spray directly on fruits or vegetables in the field, on trucks, or at docks.
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# Men & Companies

**John M. Seabrook** (left) is new president of Seabrook Farms Co., world's largest integrated farming and quick-freezing concern, succeeding his father, **Charles F. Seabrook** (right) who becomes chairman of the board.

## Industry

**American Bakeries Co.'s** new Anderson, S. C. plant, completed in March, is now in production.

**American Home Foods, Inc.,** New York City, has purchased Dennison's Foods, Oakland, Calif.

**Armour & Co.** is planning construction of a distribution plant in Memphis.

**Baby Formulas Co.** has broken ground for a $170,000 plant in San Francisco, claimed to be world's largest formula-making facility.

**Bell Brand Foods, Ltd.,** has opened its new $1 million, 70,000 sq. ft. product and packaging factory in Los Nietos, Calif. to turn out potato and corn chips, and peanut butter products.

**Can-A-Pop of California,** Compton, has reached its full production capacity of 1 million cases monthly.

**Brookfield Ice Cream Ltd.,** St. John's, Nfld., has established a branch manufacturing branch in Grand Falls, Nfld.

**Cantrell & Cochrane Corp.** opened their Chicago plant for the production of C & C Super-Coola carbonated soft drinks in cans.

**Carnation Co., Los Angeles,** and **Western Condensing Co.,** San Francisco, has organized a jointly-owned subsidiary to make and market "certain dry milk products".

**Central Soya Co., Inc.,** Fort Wayne, Ind., plans erection of a multi-million dollar soybean processing and feed manufacturing plant near Chattanooga.

**Consolidated Foods Corp.** announced the following appointments: John M. Sarther, director of distribution in Chicago and the Midwest areas; Arthur G. Ender, president of Consolidated's Sprague Warner Div.; Max H. Horn, president of the newly created Export Div.; and V. R. Van Natta, president of Monarch Finer Foods Div. to succeed Horn.

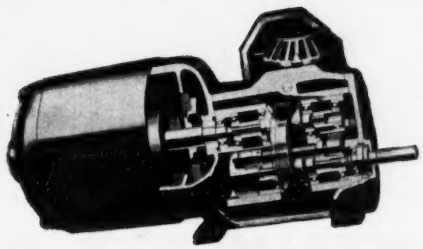
**Foremost Dairies, Inc.,** is planning a new plant in Hong Kong to supply milk and ice cream to the Armed Forces.

**General Foods Corp.,** has signed preliminary agreements to acquire 4 Seasons, Inc., manufacturer of salad dressing bases and other condiments.

**General Mills, Inc.,** has appointed J. F. Matthes and Henry S. Kingman as Cereal Products Supervisors in the Grocery Products Div.

**Hickory Valley Farm,** largest mail order sellers of smoked

**Charles S. McWilliams** has been appointed chief of the Cereal & Baked Products Div. of the Quartermaster Food & Container Institute, Chicago.



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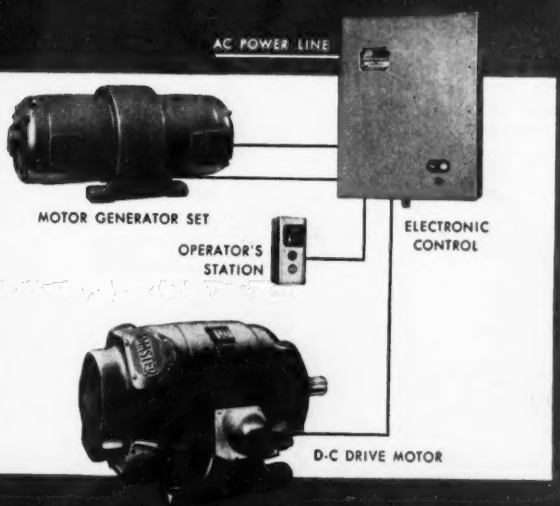
**SIZES.** ¼ to 5 HP with speed ranges up to 8 to 1.

**FEATURES.** Long life all-metal construction, very compact unit gives constant torque, infinitely variable speed operation.

**ELECTRONIC SPEEDRANGER**

**SIZES.** ⅛ to 15 HP with speed ranges up to 6 to 1.

**FEATURES.** Constant torque rating, smooth starting, good regulation . . . with jogging, reversing, dynamic braking, and wide speed ranges as optional features.




# SPEEDRANGER

If you need unbiased help in selecting the correct type of variable speed unit . . . come to Master, the only manufacturer of variable speed drives who can offer you a choice between the advantages of MECHANICAL variable speed and ELECTRONIC variable speed operation. And since both the mechanical and the electronic drives are available with any of MASTER'S five types of gear units, you can secure speed variation in either high speed or low speed ranges. Always check with MASTER for impartial help in selecting the drive that is right for you.

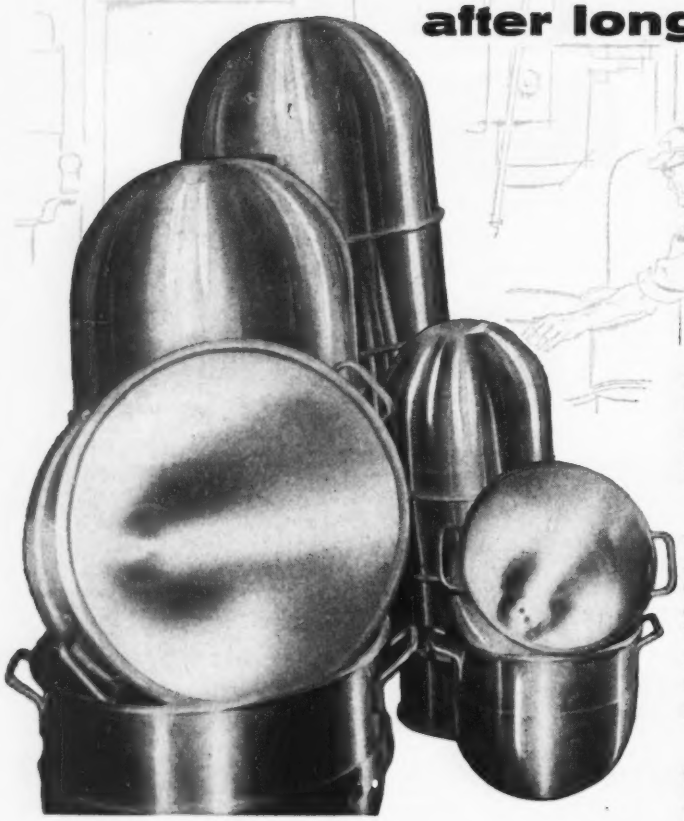
**THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO**

Mixing bowls made of Crucible stainless steel by American Car and Foundry Company, at its Milton, Pennsylvania plant.

# CRUCIBLE STAINLESS STEEL

## keeps its shine

## after long, hard wear...



The fact is stainless steel improves with wear, for the more it is used the harder and smoother the surface becomes. And there is never any surface plating to wear on a stainless product, for stainless steel is *stainless* all the way through.

Yes, Rezistal® stainless is a *natural* for products that must take long hard service, or that must resist corrosion or wear, or stand up under daily cleaning with strong detergents. Take, for example, the stainless mixing bowls shown. They'll give many years of trouble-free service. And their smooth, sanitary surface makes them especially suited to the processing of baked goods, candy, cosmetics or chemicals.

Be sure you take advantage of all the money- and time-saving qualities of stainless steel. And be sure you specify Crucible stainless . . . made by the country's leading producer of special purpose steels. You'll get fast delivery of the grade and size you need when you call Crucible.

**CRUCIBLE** first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

New members of the board of Southern Dairies, manufacturers of Sealtest Dairy Products (left to right): **W. G. Burton, F. W. Lawrence,** and **J. H. Laher, Jr.**

hams, turkeys, and other Penn-Dutch products in U. S., announced they would turn out for the first time in the firm's history, a line of canned products to be sold in retail outlets.

**Kraft Foods Co.** is preparing to introduce some of its food products into England and Germany.

**Lady's Choice Foods, Inc.** of San Francisco and Los Angeles, has entered the Hawaiian market with headquarters in Honolulu.

**Thomas J. Lipton, Inc.,** Hoboken, N. J., is planning to build its fourth processing and bagging plant in Suffolk, Va.

**Lucky Lager Brewing Co.** will start construction on a $1,400,000 addition to its San Francisco brewery.

**Marathon Corp.** has completed plans for the construction of a food package manufacturing plant at Modesto, Calif.

**Ogdensburg Creameries, Inc.,** has purchased the old International Harvester Bldg. in Ogdensburg, N. Y., to convert into a $750,000 manufacturing plant.

**Pepsi-Cola Co.** will erect a new brick bottling plant in Rockingham, N. C. to be completed by Oct. 1.

**Planters Nut and Chocolate Co.** has placed in operation its new $2.5 million processing plant in San Francisco.

**Rosenberg Bros. & Co., Inc.,** and **Bonner Packing Co.,** both of Calif., have consolidated their raisin operations.

**St. Clair Foods, Co., Ltd.,** barbecue canning processors of McAllen, Tex. will open its San Juan canning plant Aug. 1.

**Shaw's Packing Co., Inc.,** Grenada, Miss., has been chartered with authorized capital stock of $150,000.

**Sugar Association, Inc.** has elected the following officers: president, Ernest W. Greene, vice-president of Hawaiian Sugar Planters Assoc.'s Washington office; Board Chairman, David M. Keiser, president of Colonial Sugars Co.; vice-presidents, Horace Havemeyer, Jr., president of National Sugar Refining Co., Inc.; Wallace C. Kemper president of Southdown Sugars, Inc., and Robert H. Shields, president of U. S. Sugar Assn.

**United Fruit Co.** and its Nicaraguan subsidiary, Cukra Development Co., have sold approximately 320,000 acres of land to the Nicaraguan government.

## Personnel

**J. Linwood Antrim, Jr.,** president-treasurer of C. W. Antrim & Sons, is new president of Southern Coffee Roasters Assn.

**Alfred Appel** has been elected to the board of B. Manischewitz Co.

**Kurt Becker** was elected president of Amer. Soc. of Brewing Chemists at the annual meeting in Milwaukee.

**Herman Benz** has been named a board member of Buitoni Foods Corp.

**Edmund R. Campbell** is new manager of the new Milwaukee plant of Metropolitan Bottling Co., Inc., subsidiary of Pepsi-Cola Co.

**David M. Close** has joined the Walter Baker Chocolate & Cocoa Div. of General Foods as assistant product manager for Farmington chocolate and confectionary products.

**Wilbur M. Collins** has been elected president of Canada Dry Ltd.

**Ideal for Dairy and Food Industries**

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

***RENEWABLE RUBBER COVER.*** The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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**REFRIGERANT SUPPLY MEETS DEMANDS...**

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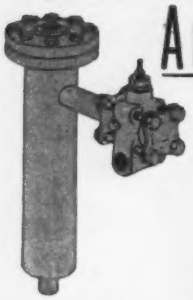
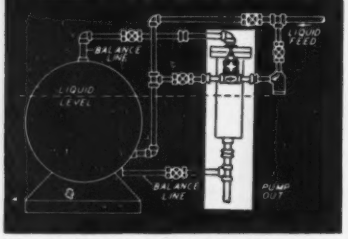


**PHILLIPS**

**FLOAT CONTROLS**




The Phillips No. 101 Remote Feed Valve with Vertical Float Chamber is especially designed to control feed of liquid ammonia or Freon to shell coolers, large coil rooms and similar evaporation installations. Smooth, dependable modulating control is assured by several unique features:

No. 101 Valve in typical low side installation on ammonia flooded cooler.

- **BY-PASSES FLASH-GAS.** Operates smoothly with minimum disturbance from gaseous refrigerant.
- **EXTERNAL LIQUID LEVEL ADJUSTMENT.** Permits changing ammonia level without "pump-down".
- **EASILY SERVICED.** All working and replacement parts, especially needle and seat, readily accessible.
- **INSULATION** may be applied to float chambers, leaving valve exposed and accessible.

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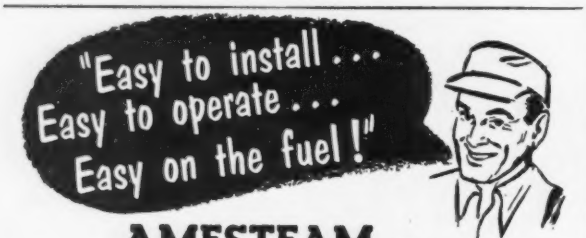
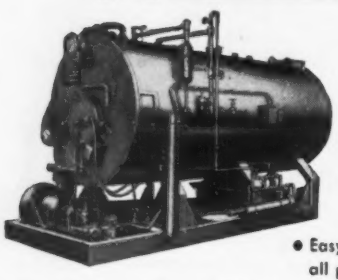



**AMESTEAM GENERATOR**



- A complete unit, piped and wired, ready for service connections.
- Needs no special foundation or expensive stack.
- Fully automatic... attention-free.
- 80% efficiency means real fuel savings.
- Easy to clean and service... all parts accessible.

20 SIZES — 10 to 600 h.p. —
15 to 200# OIL OR GAS

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Complete engineering facts on the exact AMESTEAM GENERATOR to do your job and save you money. Write today!

**AMES IRON WORKS**

**BOX B-74 OSWEGO, N. Y.**

New vice-presidents of Stokely-Van Camp, one of U. S.'s largest packers of fruits and vegetables (left to right): **Charles E. Tinkle, John A. Robins, Alfred J. Stokely,** and **Charles A. Nugent.**

**Arthur H. T. Crosbie,** manager of Waterford, Ont. branch, has been promoted to quality control supervisor of Canadian Canners Ltd.'s Niagara Falls and midwest areas.

**Richard F. Curry** was selected as managing director of National Preservers Assn.

**Francis J. Donohue,** in charge of quality control at Nestle Co., Inc.,'s Fulton, N. Y. chocolate plant, has been elected chairman of Syracuse section of Amer. Soc. for Quality Control.

**A. E. I. Falconar** is new tea manager of the Savannah plant of Tetley Tea Co.

**Glenn Fullerton** has been promoted to position of general manager of Remar Div. of Interstate Bakeries Corp., Oakland.

**E. M. Leaver** has been elected to the board of Kellogg Co., Battle Creek, Mich.

**Gerrit Leonard** is new president of Amer. Spice Trade Assn.

**William J. Megowen** is new vice-president and director of Salerno-Megowen Biscuit Co., of Chicago.

**Paul Weinschenk** is new vice-president of recently organized Rheingold Brewing Co. in Los Angeles.

**Elmer C. Yoder** was elected president of the Processed Apples Institute Inc.

## Associated Industries

**American Can Co.** announced appointment of G. T. Bergstrom as superintendent of manufacture of its Pacific division.

**American Machine & Foundry Co.** has changed its corporate name to ACF Industries, Inc., and will consolidate its executive, administrative and sales offices on four floors of its new building in New York City.

**Container Corp. of America** has moved into the flexible packaging field with the acquisition of Traver Corp., Chicago.

**J. H. Day Co., Inc.** has appointed Stuart P. Kessler as sales manager of Day and Vicars ovens and machinery for the biscuit and cracker industry.

**International Paper Co., Bagpak Div.,** is opening a new converting plant for the production of multiwall sacks in Mobile, Ala.

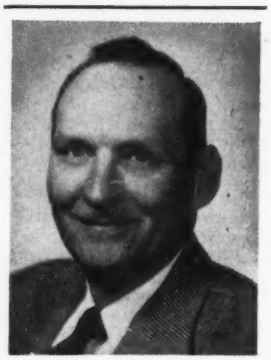
**National Can Corp.** has begun construction of new Baltimore facilities as part of a $5 million expansion program.

## Deaths

**Mark H. Fox,** 73, former president of Marwyn Dairy Products Corp.—May 27.

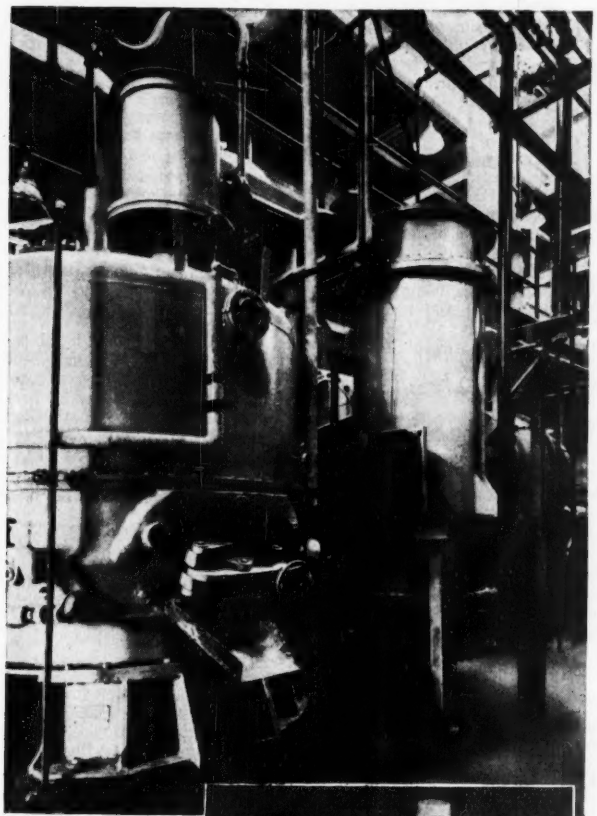
**William Hollander,** 79, beverage manufacturer of Elizabeth, N. J.—June 12.

**Samuel E. Perkins,** 76, retired president of J. O. Whitten Co., Inc., Winchester, Mass.—June 10.



**Wilbur Kretlow,** author of many articles on food colors, has been elected vice-president of Wm. J. Stange Co. in charge of the Certified Food Color Div.

# Takes the WAVER OUT of spice flavor...



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Now, you can improve the taste of your products with the smooth mellow blend of **controlled** spice flavors in SOLUBLIZED SEASONINGS Griffith chemists maintain a new high standard of potency, purity and uniformity in each extractive—by an exclusive extraction process* developed by Griffith research.

With each spice extractive always of uniform quality, blending is a laboratory science that assures flavor control for users of SOLUBLIZED SEASONINGS. That's a big sales advantage worth looking into—**today.**

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# Just Off the Press

## New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

## Food Plant Equipment

### Control Drives

Operation and application details on automatic variable speed drive. Bulletin M-542. 6 p.—*Reeves Pulley Co., Columbus, Ind.*

**Circle 212A on Reader Service Card**

### Vertical Compressor

Illustrated engineering data on current models of enclosed, vertical twin cylinder, single acting ammonia compressor, with compressor drives. Bulletin 301. 12 p.—*Vilter Mfg. Co., Milwaukee 7.*

**Circle 212B on Reader Service Card**

### Fabricated Valves

Types of wedge gate fabricated valves made to specification for use on pulp, liquor, vapor and various corrosive liquids. 4 p.—*Fabri-Valve Co. of America, 2100 N. Albina Ave., Portland 12, Ore.*

**Circle 212C on Reader Service Card**

### Single-End Bottle Washer

Step-for-step description and cutaway views of operation of single-end bottle washer for handling quarts, pints and splits. Bulletin G-491. 8 p.—*Cherry-Burrell Corp., Dept. AS-12, 427 W. Randolph St., Chicago 6.*

**Circle 212D on Reader Service Card**

### Gates and Valves

Line of gates and valves including special double closure bin valve and bin gate, with details of dimensions and photos. Bulletin 1252. 18 p.—*Stephen-Adamson Mfg. Co., Aurora, Ill.*

**Circle 212E on Reader Service Card**

### Vibrating Feeder

Description and illustrations of vibrating feeder that operates at near-reasonable frequencies. Data Sheet 5302.—*Richard Scale Co., Van Houten Ave., Clifton, N. J.*

**Circle 212F on Reader Service Card**

### Storage Tanks

Detailed illustrated information on line of cylindrical storage tanks. Bulletin G-496. 4 p.—*Cherry-Burrell Corp., Dept. AS-15, 427 W. Randolph St., Chicago 6.*

**Circle 212G on Reader Service Card**

### Brakes and Clutches

Line of small electric brakes and clutches with photos and section diagrams. Bulletin 6158. 6 p.—*Warner Electric Brake & Clutch Co., Beloit, Wis.*

**Circle 212H on Reader Service Card**

### Pressure Regulators

Models of pneumatic pressure regulators with high flow capacity for fast response. Leaflet 608.166—*General Controls Co., 801 Allen Ave., Glendale 1, Calif.*

**Circle 212I on Reader Service Card**

### Volume Pumps

Graphic presentation of pump operating principles, capacity pressure and air-consumption tables for use with air-powered controlled volume pumps. Bulletin 1053. 16 p.—*Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18.*

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### Double-End Bottle Washer

Description, illustrations, specifications and dimensions of short, double-end bottle washer to handle quarts, pints and splits at rates to 240 bottles per minute. Bulletin G-490. 8 p.—*Cherry-Burrell Corp., 427 Randolph St., Chicago 6.*

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### Heat Pump

Self-contained all-electric system that provides warm filtered air in winter and cool, dehumidified air in summer. 4 p. bulletin.—*Westinghouse Air Conditioning Div., Dept. T-557, 200 Readville St., Hyde Park, Boston 36.*

**Circle 212L on Reader Service Card**

### Heat Transfer Equipment

12 different process heating and cooling operations employing Platecoils, with discussion of possible benefits. 20 p. brochure.—*Tranter Mfg., Inc., Lansing 4, Mich.*

**Circle 212M on Reader Service Card**

### Heating Sets

Illustrated information on design and construction of fuel-oil heating and pumping sets with form to help engineers in drawing up comprehensive specifications for bidding. Bulletin. OB-53. 28 p.—*Engineer Co., 75 West St., New York City 6.*

**Circle 212N on Reader Service Card**

### Electric Vibrator

Factual and technical data on line of enclosed, practically noiseless vibrators. Catalog 10. 4 p.—*Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13.*

**Circle 212O on Reader Service Card**

### Water Demineralizers

Dimensional, installation and performance data on line of mixed-bed, two-bed and four-bed demineralizers, with photos, drawings, and diagrams.—Catalog 127. 20 p. *Barnstead Still & Sterilizer Co., 249 Lanesville Terrace, Forest Hills, Boston 31.*

**Circle 212P on Reader Service Card**

### Machinery Mounts

Description of mounts to anchor and level heavy machines without bolting or shims. Form DR—154-10. 4 p.—*Barry Corp., Dept. L & L, 700 Pleasant St., Watertown 72, Mass.*

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### Stapling Machines

Information on large, semi-automatic stapling machines for closing center-slotted cartons top and bottom simultaneously. Booklet Q-501. 8 p.—*International Staple & Machine Co., 801 Herrin St., Herrin, Ill.*

**Circle 212R on Reader Service Card**

### Diaphragm Pump

Description of diaphragm pump for volume controlled pumping which also functions as a chemical feeder, meter, filling machine and proportioner and sampler. Bulletin 440. 24 p.—*Lapp Insulator Co., Inc., Process Equip. Div., LeRoy, N. Y.*

**Circle 212S on Reader Service Card**

### Circulating Unit

Immersion unit that cools or heats and thoroughly circulates. Bulletin 350. 8 p.—*Hamilton Copper & Brass Works, Inc., Dixie Highway & Lincoln Ave., Hamilton, Ohio.*

**Circle 212T on Reader Service Card**

### Condenser Tubing

Analyses and mechanical properties of 29 carbon, alloy and stainless tubing steels used in various types of heat exchangers and condensers. Bulletin TB-329A. 6 p.—*Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.*

**Circle 212U on Reader Service Card**

### Miscellaneous Equipment

Information on various types of industrial equipment, including condensers and coolers, refrigeration compressors, multi-v-drives, turbines, ejectors, deaerators, and pumps. Bulletin WP-1099-B61. 16 p.—*Worthington Corp., Promotion Dept., Harrison, N. J.*

**Circle 212V on Reader Service Card**

### Transforming Mechanisms

Line of operators for transforming air signals into mechanical motion or force through changes in air pressure. Bulletin 414-1. 8p.—*Minneapolis-Honeywell Regulator Co., Indus. Div., Wayne & Windrim Aves., Philadelphia 44.*

**Circle 212W on Reader Service Card**

### Truck Refrigeration

Packaged electrical system for mechanical truck refrigeration. Form GEA-6084. 4 p.—*General Electric Co., Schenectady, N. Y.*

**Circle 212X on Reader Service Card**

### Boiler Blowoff

How to save boiler plant fuel and labor costs by means of continuous boiler blowoff heat recovery equipment, with charts and detailed flow diagrams. Bulletin WC-114. 8 p.—*Graver Water Conditioning Co., 216 W. 14th St., New York City 11.*

**Circle 212Y on Reader Service Card**

### Rotary Union

Revolving connection for use in all process industries to supply fluids or gases to revolving machine rolls or drums. Bulletin 700. 16 p.—*Perfecting Service Co., 332 Atando Ave., Charlotte, N. C.*

**Circle 212Z on Reader Service Card**

### Utility Equipment

Description and illustrations of recent developments in laboratory furniture and utility equipments items. Catalog A. K-54. 24 p.—*Schaar & Co., 754 W. Lexington St., Chicago 7.*

**Circle 212AA on Reader Service Card**

### Metal Detector

Details of electronic metal detector, including wide range of signal and reject system arrangements and arrangements for handling bulk and packaged materials. Bulletin B-1920-A. 2 p.—*Dings Electronics, Inc., 4740 W. Electric Ave., Milwaukee 46.*

**Circle 212AB on Reader Service Card**

### Metal Chain

Pictorial presentation of available metal chain, its properties and uses. Bulletin 53-56. 10 p.—*Chain Belt Co., Dept. P. R. Milwaukee 1.*

**Circle 212AC on Reader Service Card**

### Motor Pulleys

Engineering data on variable pitch motor pulleys with photos, diagrams, general dimension tables. Catalog 652. 30 p.—*Gerbing Mfg. Corp., Northbrook, Ill.*

**Circle 212AD on Reader Service Card**

### Solenoid Valves

Line of cast iron and cast steel solenoid valves in sizes from ¼ to 2 in. Bulletin 106.—*Atkomatic Valve Co., 545 W. Abbott St., Indianapolis, Ind.*

**Circle 212AE on Reader Service Card**

### Agitated Kettles

Features of line of agitated kettles in metals ranging from aluminum to stainless steel, with illustrations. Brochure.—*Colonial Iron Works Co., 17643 St. Clair Ave., Cleveland 10.*

**Circle 212AF on Reader Service Card**

### Displacement Pump

Construction and performance features of compressed air operated displacement pump which can be installed above level of

liquid being pumped. 4 p. bulletin.—*Ferro Corp., 4150 E. 56th St., Cleveland 5.*
**Circle 212AG on Reader Service Card**

**Packaging Machine**

Information on semi-automatic packaging machine which vacuums and heat seals perishable products in flexible pouches. Leaflet.—*Standard Packaging Corp., 629 Grove St., Jersey City, N. J.*
**Circle 213A on Reader Service Card**

**Strapping Machine**

Unit for application of flat steel strapping to packages and containers. Leaflet.—*Acme Steel Co., 2840 Archer Ave., Chicago 8.*
**Circle 213B on Reader Service Card**

**Dust Control Equipment**

Description of rotary arm dust collector. 4 p. bulletin.—*Turner & Haws Engineering Co., Inc., West Roxbury, Mass.*
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## Plant Supplies

**Insulating Adhesives**

Features of lagging adhesive and coatings for shrinking, sizing, bonding and protecting insulation lagging fabrics, with typical installations. Catalog 37-D. 4 p.—*General Paint Corp., 2627 Army St., San Francisco 19.*
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**Fire Protection**

Description of automatic sprinkler-type fire extinguishers. Bulletin SP-753. *Stop-Fire, Inc., 125 Ashland Pl., Brooklyn 1.*
**Circle 213E on Reader Service Card**

**Resin Resume**

Summary sheet on five coating and impregnating varnishes, an adhesive, and six bonding and laminating silicone electrical insulating resins along with recommended applications. Leaflet.—*Dow Corning Corp., Midland, Mich.*
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**Rubberized Abrasives**

Adaptability and application of rubberized abrasives designed for burring, smoothing and polishing operations after dimensional grinding and shaping. Catalog 53.—*Cratex Mfg. Co., 81 Natoma St., San Francisco 5.*
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**Steam Hose**

Line of steam hose and their uses, with cut-away photo of various types of construction. 4 p. bulletin.—*Quaker Rubber Corp., Tacony & Comly Sts., Philadelphia 24.*
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**Titrating Instrument**

Automatic titrating instrument for vitamin $B_{12}$ assays said to cut lab time by two-thirds. Data Sheet K-22-18.—*Beckman Instruments, Inc., S. Pasadena 1, Calif.*
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**Work Platforms**

All-steel portable and stationary custom-fitted platforms for working at high levels. 6 p. folder.—*Ballymore Co., Wayne, Pa.*
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**Gage Illuminators**

Single or double section illuminators for even diffusion of light over gage length. Data Unit 242.—*Jerguson Gage & Valve Co., 80 Fellsway, Somerville, Mass.*
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**Flavoring Materials**

Information on wide variety of essential oils, perfume bases and flavoring materials. Catalog for Jan.-April, '54. 24 p.—*Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., New York City 13.*
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**Glass Insulation**

Features of aluminum wrapped-at-the-factory cellular glass insulation. Leaflet F1-102A-35M.—*Pittsburgh Corning Corp., One Gateway Center, Pittsburgh 22.*
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**Plastic Materials**

Features and uses of Teflon and also recently developed plastic bearing material requiring no lubrication. 4 p. brochure.—*Dixon Saddle Co., P. O. Drawer 7, Bristol, R. I.*
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**Dairy Cleaner**

Pocket guide for cleaning in dairies, milk and ice cream plants, especially with medium-hard water supply, using dust-free detergent. Form DS-8. 8 p.—*Diamond Alkali Co., 300 Union Commerce Building, Cleveland 14.*
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**Stainless Steel Coating**

Information on chemically inert plastic resins said to have unusual resistance to acids, chemical salts and abrasions. Catalog 15M. 8 p.—*Steelcote Mfg. Co., St. Louis 3.*
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**Building Insulation**

Information on properties of loose-fill fireproof building insulation and current uses. Two illustrated booklets.—*Vermiculite Institute, 208 S. LaSalle St., Chicago 4.*
**Circle 213Q on Reader Service Card**

**Air Control System**

Description of control system for removal of smoke, fumes, moisture and for reclaiming by-products.—*Mechanical Industries, Inc., 930 Grogan Bldg., Pittsburgh 22.*
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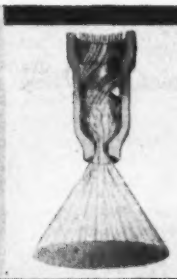

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### Aluminum Chemicals

Description of alumina trihydrate essentially free of organic contamination, aluminum dross, bauxite and aluminum powders. Bulletin C2-10-354. 4 p.—*Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.*

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### Filament Tape

Properties and applications of elastic, adhesive filament tape for unitizing bagged goods. Bulletin P-FTU. 4 p.—*Minnesota Mining & Mfg. Co., St. Paul 6, Minn.*

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### Tank Filter

Product for protecting distilled water in storage from bacteria, dust, mist and gases. Bulletin 131. —*Barnstead Still & Sterilizer Co., 249 Lanesville Terrace, Boston 31.*

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### Corrosion-Resistant Coatings

Classification tables on corrosion resisting coating, lining, and surfacing materials giving description of product, uses, methods of application and cost. Bulletin 10M. 4 p.—*Carbonine Co., 331 Thornton Ave., St. Louis 19.*

Circle 214D on Reader Service Card

## Materials Handling

### Package Conveyor

Illustrated presentation of light steel wire belt conveying system for light packages. 6 p. leaflet.—*Union Steel Products Co., Albion, Mich.*

Circle 214E on Reader Service Card

### Industrial Carriers

Information on line of straddle carrier trucks for heavy material handling, with application photos. Bulletin C-1. 16 p.—*Clark Equipment Co., Benton Harbor, Mich.*

Circle 214F on Reader Service Card

### Flour Handling

Description of pneumatic conveyor system for handling flour from carriers to storage and storage to processing, with installation photos and process diagrams. Bulletin A F-100. 16 p.—*Fuller Co., Catasauqua, Pa.*

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### Pallet Loading Machine

Features and operation photos of automatic pallet loading machine. Series 200 bulletin. 8 p.—*Alvey Conveyor Mfg. Co., 9301 Olive St. Rd., St. Louis 24.*

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### Side Loading Unit

Description and illustrations of side-loading lift truck designed to handle long bulky loads, with attachments for special jobs. Bulletin 1360. 8 p.—*Baker-Raulang Co., 1250 W. 80th St., Cleveland 2.*

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### Handling Systems

Description and illustration of specific industrial examples of material handling systems, including bulk-grain handling for brewing industry. Bulletin 400. 30 p.—*Gifford-Wood Co., Hudson, N. Y.*

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### Loading Dock

Data on 20,000 lb. capacity hydraulic adjustable dock ramp. Leaflet.—*Rowe Methods, Inc., 2534 Detroit Ave., Cleveland 13.*

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### Two-Direction Conveyor

Information on totally enclosed conveyor featuring a two direction chain. Bulletin R-20. 4 p.—*Prab Conveyors, Inc., 19815 E. Nine Mile Rd., St. Clair Shores, Mich.*

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## Control Equipment

### Water Baths

Description of series of water baths with comprehensive range of accessories. Bulletin FS-244. 4 p.—*Fisher Scientific Co., 717 Forbes St., Pittsburgh 19.*

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### Recording Controller

Facts on potentiometric and a-c bridge recorders and recording controllers featuring continuous standardization and centerless pointer. Catalog GED-2100. 20 p. —*General Electric Co., Schenectady, N. Y.*

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### Thermocouple Converter

Features and operation of amplifier-converter unit to be used with thermocouples or other low-voltage d-c input equipment. Bulletin A-712.—*Autronic Controls Div., Swartwout Co., 18511 Euclid Ave., Cleveland 12.*

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### Liquid Level Indicators

Engineering data, application and installation information on precision liquid level indicators with accessories. Bulletin S-68. 8 p.—*Bogue Mfg. Co., Paterson 3, N. J.*

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### Filtration Medium

Description of new porous filtration medium resistant to all strong acids, caustics, oxidizing agents and common organic sol-


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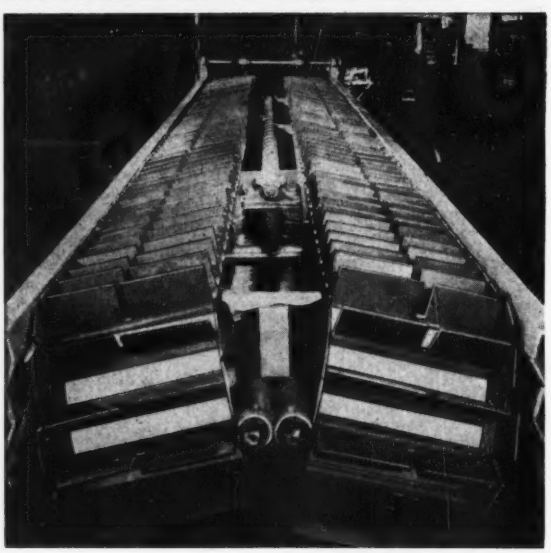

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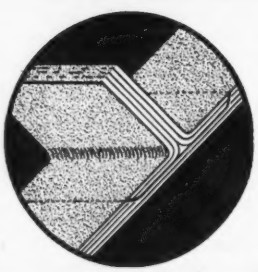

vents. Brochure T-103.—*Porous Plastic Filter Co., Glen Cove, N. Y.*

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### pH Meter

Facts on line-operated pH meter emphasizing simplicity and modernity of design, and low-price. Bulletin 225. 4 p.—*Photovolt Corp., 95 Madison Ave., New York City 16.*

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### Temperature Indicators

Single circuit thermo-electric pyrometers for temperature measurement beyond 1000 deg F. Bulletin 4371. 6 p.—*Illinois Testing Labs., Inc., 420 N. LaSalle St., Chicago 10.*

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### Hydrometers and Thermometers

Listing of nearly 1,000 models of hydrometers and thermometers made in accordance with standard specifications. 36 p. catalog—*Emil Greiner Co., 20-26 N. Moore St., New York City 13.*

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### Filtration Equipment

Description and actual samples with table on performance and of types of vacuum filter media, characteristics. 6 p. folder.—*Eimco Corp., Salt Lake City 10.*

Circle 215D on Reader Service Card

### Control Equipment

Line of electrical distribution and control equipment, covering every link between utility power source and industrial application. Bulletin 1052. 4 p.—*Continental Electric Equipment Co., Box 1055, Cincinnati 1.*

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### Control Instruments

Line of instruments for complete process control, including recorders, controllers, indicators, combustion safeguards and accessories. Catalog F-5633-1. 4 p.—*Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.*

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### Electronic Controls

Information on electronic temperature control, operating on principle of change of resistance of wire-wound sensing element with temperature variations. Series 97 bulletin.—*Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. 4th St., Philadelphia 33.*

Circle 215G on Reader Service Card

### Flow Measurer

Construction and operation features of standard precision instrument for measuring fluid rate of flow, with illustrations and capacity tables. Bulletin 18-RG. 4 p.—*Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.*

Circle 215H on Reader Service Card

### Dial Thermometers

Illustrated description of types of dial thermometers and accessories. Catalog DT-1-54. 8 p.—*Rochester Mfg. Co., Inc., Rochester 10, N. Y.*

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## Miscellaneous

### Buyer's Guide

1954 edition of instrument transformer buyer's guide, fully illustrated, with ratings, accuracy classifications and prices. Bulletin 4626G. 96 p.—*General Electric Co., Schenectady 5, N. Y.*

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### Filtration Data

Factors governing efficiency of brewery filtration systems, application of filter-aid filters and tables of practical information. Form HW 10-53. 20 p.—*Process Filters, Inc., 1807 Elmwood Ave., Buffalo 7.*

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### Punched-Card Computer

Features and illustrations of electronic punched-card computer with typical applications. Catalog TM842. 6 p.—*Remington Rand Business Equipment Center, 315 Fourth Ave., New York City 10.*

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### Fabricating Steel

Basic information and advanced techniques for fabricating clad steels. Wall-mount chart.—*Marketing Services, Lukens Steel Co., Coatesville, Pa.*

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### Electronic Instruments

Listing of comprehensive line of electronic instruments including description of laboratories services and production plants engaged in electronic manufacture. Form 2J8174. 26 p.—*Industrial Equipment Section,, Radio Corp. of America, Camden, N. J.*

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### Sanitation Work Kit

Twenty-nine different forms which can be used in cost control management of modern sanitation program.—*Industrial Sanitation Counselors, P.O. Box 25, Crescent Hill Sta., Louisville 6, Ky.*

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If your plant is not ready with a disaster plan, better act now. There's not a single American plant that's out of range of an intercontinental bomber—and fires, floods, tornadoes or explosions can kill you just as dead as an atom bomb.

It costs next to nothing to take a few simple steps which may save hundreds of lives. Here they are. Check them off today.

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☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

***Act now . . . check off these four simple points . . . lives are at stake . . . have you a right to delay?***

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***Regardless of cooling needs***

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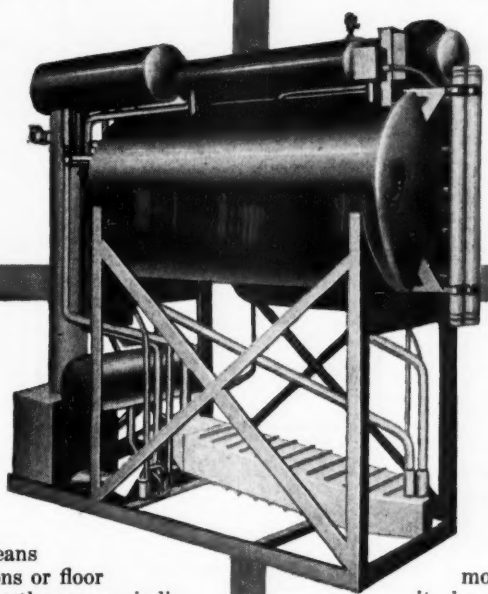

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***Under every installation situation***

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***With exclusive assurance of satisfaction***

The Servel Water Chiller cooling system has no moving parts to wear, thus it is quiet and vibration-free. Every Servel Water Chiller is backed by a 5-year warranty. See your Servel dealer or mail coupon for information and engineering co-operation.

**MAIL NOW FOR COMPLETE DETAILS!**

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Use this index to find description of equipment, supplies and services of interest to you in this issue of FOOD ENGINEERING.

## TO GET MORE INFORMATION

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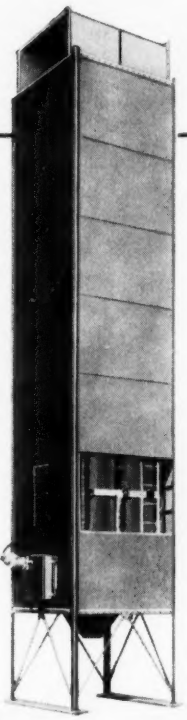

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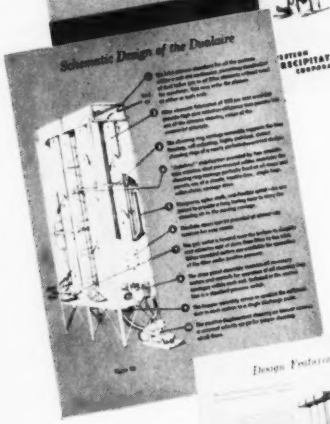


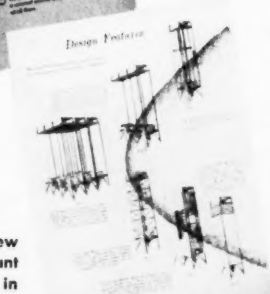

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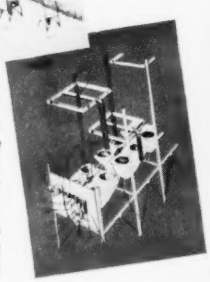

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